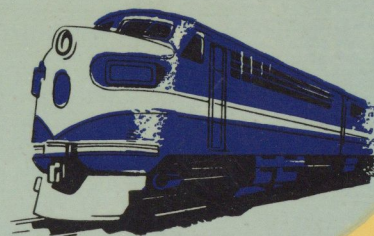
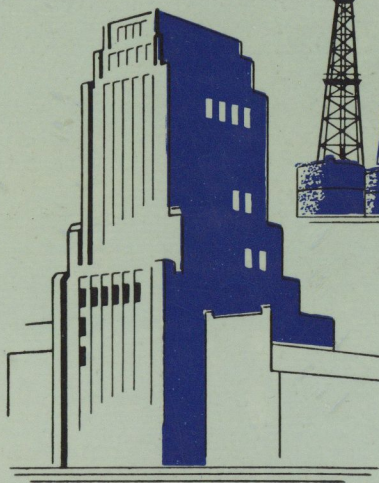


A Publication dedicated to the advancement of the science of tabulating systems



the Punched Card

Embodying Punched Card Operations in all types of Business and Industry



GILLE

Volume 1

1952-53

MARGIN — PUNCHED CONTINUOUS FORMS

CON-TIN' U- OUS • •

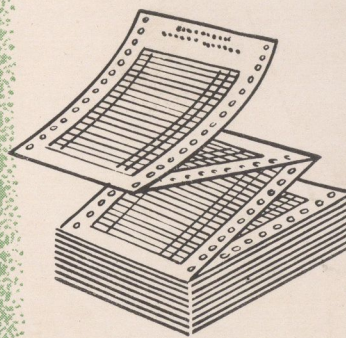
Having continuity of parts without break, cessation or interruption; without intervening space or time.

The word as defined in Webster's Dictionary has a double meaning for Clarkson Press. Of course it pertains to the ONE item Clarkson Press produces — the ONE all-important business requirement Clarkson Press *specializes* in making—Margin-Punched CONTINUOUS Forms.

But the definition also accurately describes Clarkson product and Clarkson service.

When a customer places an order with a Clarkson Press Distributor, he knows he will receive it exactly as prescribed. He knows the quality of the product will be the finest — that it will work for him "without break, cessation or interruption". He knows he will receive the maximum in performance and efficiency. And when a customer places an order, he deals *direct* with us through a Clarkson Press Distributor — a time-saving advantage that guarantees *personal service* without "needless intervening space or time" — and, we might add, without needless waste of dollars.

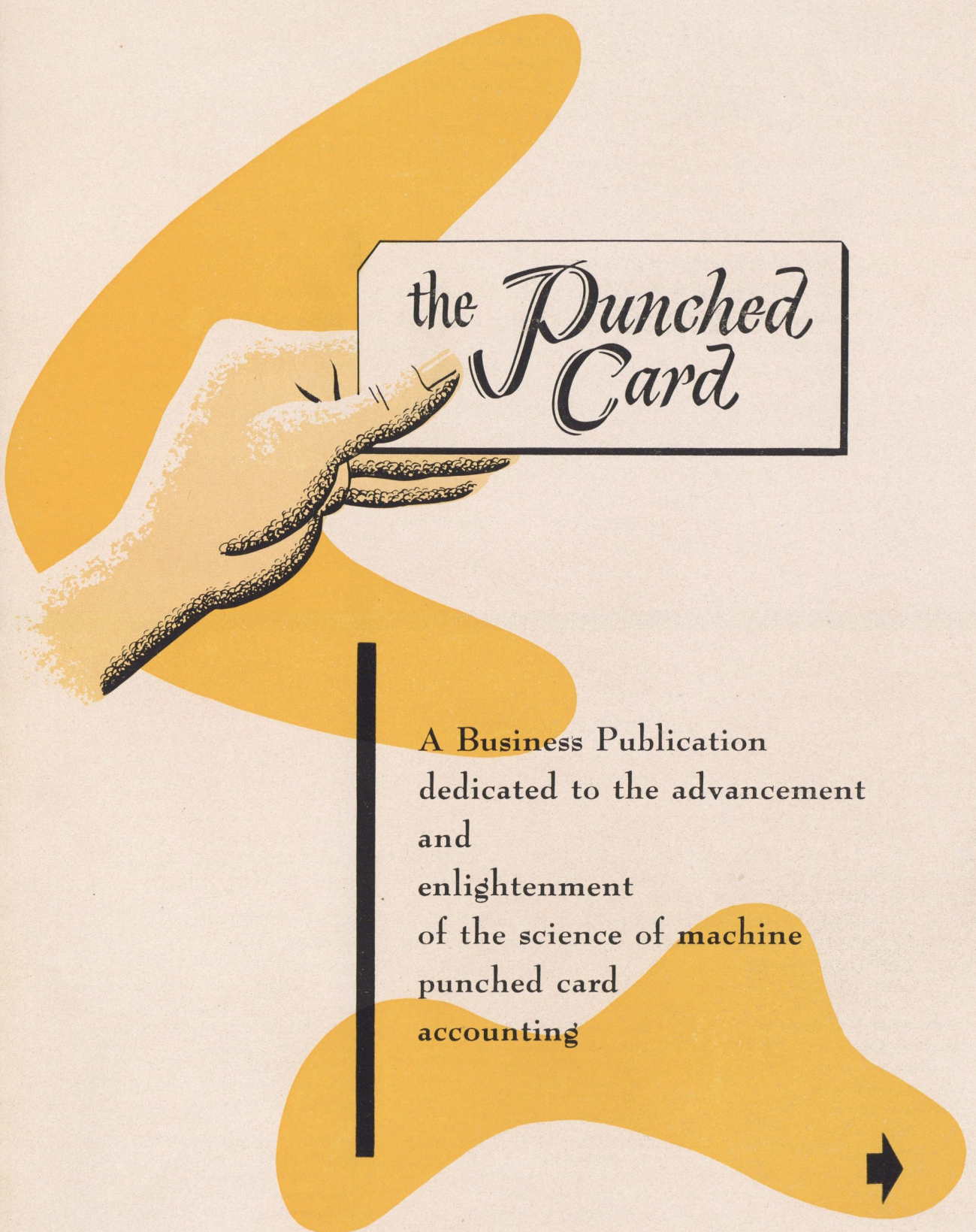
So when *you* buy Margin-Punched CONTINUOUS Forms, remember the most important word is "continuous". Remember "continuous" stands for Clarkson Press.



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Buy Direct — for a Better Buy! A Clarkson Press Distributor is experienced, qualified, — and in direct contact with factory top-management. For the Distributor in your area, write Clarkson Press Inc.

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A stylized illustration of a hand holding a card. The hand is rendered in a light yellow color with a stippled texture on the fingers. The card is white with a black border and contains the title 'the Punched Card' in a mix of serif and script fonts. The background features large, abstract yellow shapes. A thick black vertical line is positioned to the left of the descriptive text, and a black arrow points to the right at the bottom right of the page.

the *Punched* *Card*

A Business Publication
dedicated to the advancement
and
enlightenment
of the science of machine
punched card
accounting

the Punched Card

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It is with a sense of deep appreciation that we thank those who devoted their time, effort and material to make possible this first volume of "The Punched Card."

We likewise take this opportunity to acknowledge participation in "The Punched Card" by the following, and express our warm appreciation for their cooperation.

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Statistical Association
International Business
Machines Corporation
Monarch Metal Products, Inc.
Moore Business Forms, Inc.
National Machine
Accountants Association
National Tabulating
Management Association

"THE OFFICE"
Powers-Samas Accounting
Machines, Ltd.
Remington Rand Inc.
Simpla Research and Mfg.
Co., Inc.
Standard Register Company
Step-O-Flex Co.
System Sales Company
Tab Products Company
Wallace Press

The Punched Card

Volume One

"I have but one lamp by which my feet are guided, and that is the lamp of experience. I know of no way of judging the future but by the past."

THESE WORDS of Patrick Henry aptly describe the motivating factor behind the presentation of "The Punched Card." It is through the experiences of those in the tabulating field that we can learn much to further our own knowledge. The articles in "The Punched Card" are past and present experiences presented as a basis upon which future experiences in punched card accounting may be realized; this, to help serve in the enlightenment and full utilization of the information made available to the machine accounting field.

Our idea of a medium for the presentation of punched card accounting applications began in 1937. This was the beginning of our entry into the tabulating field. We are very grateful for the confidence placed in us by Norman C. Nelson, Assistant Secretary-Treasurer of The Maccabees, for the opportunity to prove our worth in this field of endeavor. Through his understanding and cooperation and our own desire to learn as much as possible about punched card accounting, the embryo of our idea was born. The idea, though dormant for a while, began to grow through the years.

It grew to such proportion, that three years ago a research program was begun. This study was to determine whether there was a desire among tabulating personnel to learn more about punched card accounting applications in other businesses and industries. From this knowledge of the work done in other installations, we had hoped to cull seeds of thought that could be embellished and developed for practical application in our own installation. Our surveys proved that this problem existed in other installations.

As time went on, further studies were made to determine what could be developed to bring about this interchange of ideas. From our original plan of a monthly publication, we learned that the tabulating field was more desirous of receiving these twelve monthly issues in one annual volume. Therefore, a medium of permanency for continual reference, as an aid to both technical and managerial problems, was decided upon.

The results of the survey were conclusive, and "The Punched Card" was born.

This is the prologue — the beginning of our story. The story continues. We made contact with the many tabulating equipment manufacturers, tabulating accessory equipment manufacturers, forms manufacturers, machine accounting societies, tabulating supervisors, and other leading authorities interested in punched card machine accounting.

It was through their cooperation and the material made available to us that "The Punched Card" began to crystallize further, to the point where it has now become a reality.

We are very grateful for the encouragement given us by the President of The Maccabees, John P. Stock in lending moral support in the final development stages of "The Punched Card."

It is not without pride that we present to our associates in the tabulating field, as well as related fields, this copy of the first volume of "The Punched Card." "The Punched Card" is not intended to serve as a panacea in solving the many problems that arise in the machine accountant's daily work life. Its purpose is to serve as a medium of interchange of ideas in machine accounting—in essence, a clearing house of punched card accounting methods, dedicated to the advancement and enlightenment of the science of tabulating systems.

We have endeavored to present applications now in use in various types of business and industry, including governmental agencies. In reading the material presented, it is hoped that the machine accountant or tabulating supervisor may be able to glean some ideas of what is being done in other installations utilizing punched cards, and transpose these ideas into applications that may become a reality in their own installations. Therefore, "The Punched Card" will act as a stimulus to add further impetus to the development of new punched card applications or improvements in present applications.

We have also endeavored to recognize the machine accountant and his department's relationship with top management in the successful operations of today's business. Thus, we feel that "The Punched Card" is a most comprehensive presentation to serve the machine accountant and tabulating supervisor as an aid in both the technical and managerial operations of the tabulating department and to be educational and informative to this end.

D. A. Talucci, Editor

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History of Tabulating Machines

—talley sticks . . . to electronics

DURING THE PAST TWO DECADES accounting methods have been modernized to such great extent, that more progress has been made during this period than in the previous three centuries. This progress has been brought about by the adoption of automatic accounting machine methods to keep apace with the growth of modern business.

Roman Abacus

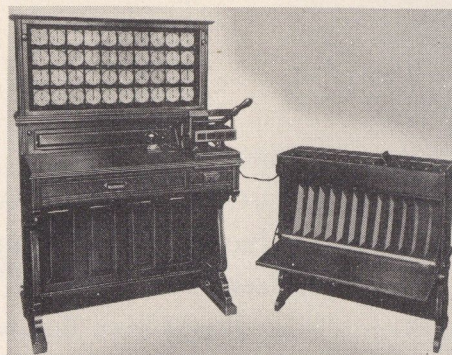
The results of today's efficient punched card machine accounting methods date back to ancient history. It was during this time that the first mechanical calculator was developed. This was operated by the use of knotted strings. The Roman Abacus permitted the mathematical problem to be developed in terms of physical counters. This enabled the mathematician to see his calculation while he wrote it out. This first step in mechanical calculation was the beginning that soon found more variations of the abacus. Some of these are still in use in the Orient.

Pascal Calculator

In the seventeenth century Pascal produced a mechanical calculator. This was a refinement of the abacus and was able to reduce mental effort to produce totals after the problem had been stated on numbered discs. The basic principles of the Pascal calculator and the Abacus still exist and few changes in their principle have been made to this day.

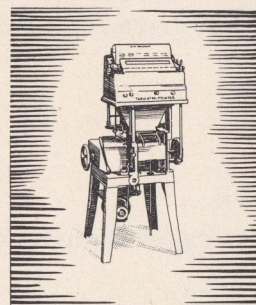
Jacquard Loom Control Card

Concurrent with the development of the Pascal calculator and the advanced uses of the Abacus, in 1780 Joseph Jacquard invented the loom control card. This was an attempt to establish a medium for weaving figured fabrics. Through several ingenious improvements in machinery, he brought to perfection the Jacquard Loom. For his achievements in these inventions he received the Golden Medal in 1804 from the Inspectors of Paris. During his period of experimentation, he encountered much opposition from a prejudice against machinery, yet he was laying the foundation for future development in the use of his loom control card.



The Original Tabulating Machine

The Census of 1890 was the first one wherein facts were compiled and tabulated by mechanical means.

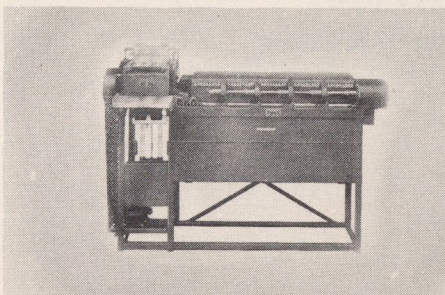


1913 First tabulator to print



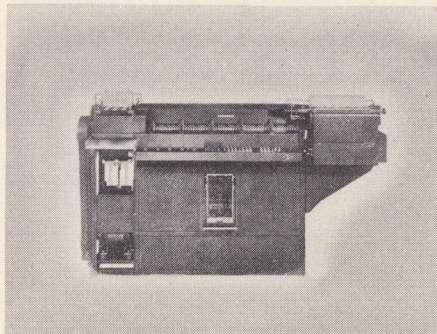
Early Tabulating Machine Installation

A tabulating machine installation (circa 1915) performing statistical work at the Aetna Fire Insurance Company.

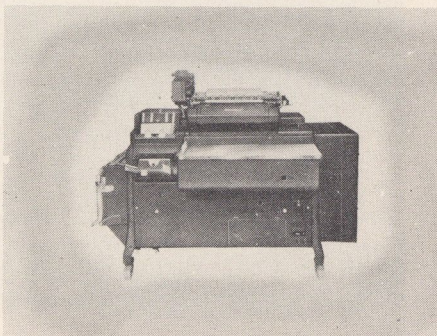


IBM Type 93 Automatic Control Tabulator

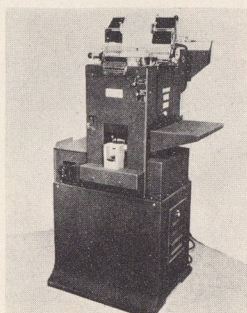
**IBM Type 285
Electric
Accounting Machine**



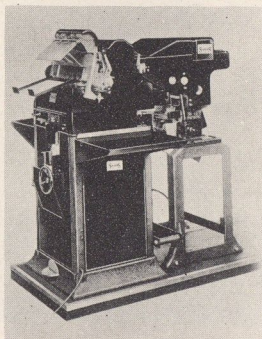
**IBM Type 405
Alphabetical
Accounting Machine**



**Samas 21
Tabulator**



**Samas 40
Tabulator
With Summary
Card Punch**



**Remington Rand
Tabulator**



It is important to appreciate the problems in the use of the Abacus and the Pascal calculator to realize that the operator of either machine had to be constantly alert to the possibility of error. A combination of these problems, plus further experimentation, brought about the desire to create new means of effecting calculations and bookkeeping methods.

English Talley Sticks

One method developed for bookkeeping and recording was the "talley stick." These were in use in England during Charles Dickens' time. Dickens aptly described the English Talley Stick that was employed for accounting purposes.

"Ages ago a sage mode of keeping accounts on notched sticks was introduced in the Court of Exchequer and accounts were kept much as Robinson Crusoe kept his calendar on the desert island. A multitude of accountants, bookkeepers and actuaries were born and died. Still official routine inclined to those notched sticks as if they were pillars of the constitution, and still the exchequer's accounts continued to be kept on certain splints of elmwood called 'tallies.' In the reign of George III an inquiry was made by some revolutionary spirit whether pens, ink and paper, slates and pencils being in existence, this obstinate adherence to obsolete custom ought to be continued, and whether a change ought to be effected. All the red tape in the country grew redder at the bare mention of this bold and original conception, and it took until 1826 to get these sticks abolished. In 1834 it was found that there was a considerable accumulation of them; and the question then arose, what was to be done with such worn out worm-eaten, rotten bits of old wood?" The sticks were housed in Westminster and it would naturally occur to any intelligent person that nothing could be easier than to allow them to be carried away for firewood by the miserable people who lived in the neighborhood. However, they had never been useful and the official routine required that they should never be, and so the order went out that they were to be privately and confidentially burned. It came to pass that they were burned in a stove in the House of Lords. The stove, heavily-gorged with these preposterous sticks, set fire to the paneling; the paneling set fire to the House of Commons; the two Houses were reduced to ashes; architects were called in to build others; we are now in the second million of the cost there."

Needless to say, the talley sticks did not serve their purpose as intended.

Analytical Engine

About 1840 Charles Babbage, influenced by the possibilities that could be further developed in the pattern loom control card of Jacquard, invented the "analytical engine." Pre-punched cards were developed to replace finger operations. The Swedish printer, Scheutz, developed further refinements in the mechanical operation of this machine.

It was upon the basis of this sequence of inventions and improvements stemming from the Abacus, Pascal calculator, talley sticks, Jacquard's loom control card, inventions of Babbage and

Scheutz, that Dr. Herman Hollerith perfected a further mechanical aid for the first successful mechanical statistical application.

Hollerith Machines

In 1880 Dr. Hollerith, then a noted statistician, was engaged by the United States government as a special agent for the 1880 census. Owing to the increase in the population, and the amount of work to determine the census figures, it was realized that by the time this work would be completed, the census would be worthless. Dr. Hollerith realized this situation and believed that some mechanical aid would be necessary to avoid the complete failure of this project. Through his experiments and the further development of the principles of his predecessors, he developed his system for transcribing census data on paper strips. Instead of numbers written on these paper strips, holes were punched. These punched holes would then actuate automatically, statistical machinery by a magnetic principle.

This first statistical tabulation was tested in New York City. These tests proved that the Hollerith method would transcribe records in two-thirds of the time required by other methods. In addition to this, the statistical data could be tabulated eight times faster. As a result of these tests, the Hollerith machines were selected for use in the United States census. The equipment consisted of a pantograph punch and electric accounting tabulator with sorting box.

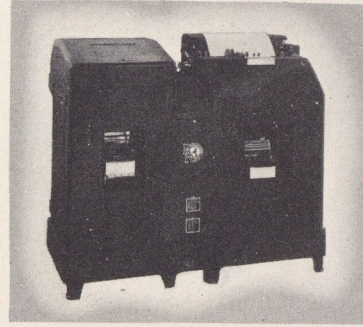
This was the beginning of punched card methods and the logical outgrowth of the work at the Census Bureau brought about experimentation for industrial and social applications. As Dr. Hollerith had improved upon the ideas and inventions of Jacquard and Babbage, he did likewise with his own machines, thus exerting a broadening influence in the statistical and accounting fields.

Due to the success and completion of his work in the Census Bureau, Dr. Hollerith withdrew from the government service. It was shortly thereafter that he obtained patents on his machines. Securing the necessary capital, he incorporated his company under the laws of the State of New York as the Tabulating Machine Company. Soon thereafter, he introduced the basic form of a numeric punch keyboard. In 1911, his company merged into the Computing-Tabulating-Recording Company, which was the forerunner of International Business Machines Corporation.

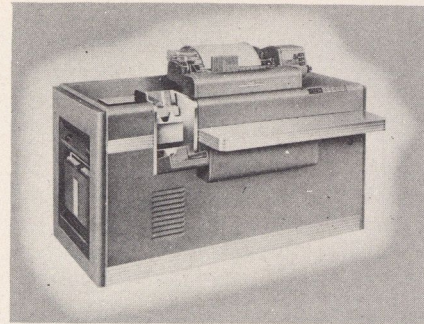
Powers Machines

During the year 1907, Mr. S. N. D. North, the Director of the U. S. Census Bureau, was making plans to take the 1910 census. To accomplish this monumental task he sought improved methods over those in the previous census of 1900. One of the many problems confronting him was the need to provide more satisfactory statistical equipment than had been formerly used. Mr. North then decided to develop machines capable of the desired results.

After investigating individuals who could produce such machines, he chose Mr. James Powers, an engineer. Mr. Powers was called to



Remington Rand
Tabulator
With Summary
Card Punch

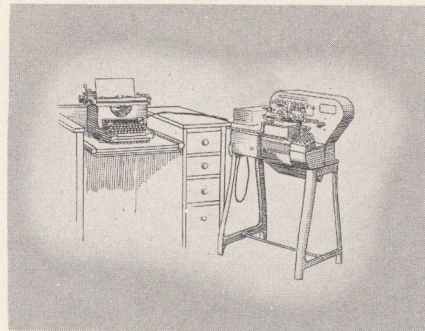


IBM Type 402
Electric
Punched Card
Accounting Machine
with Tape-Control
Automatic Carriage

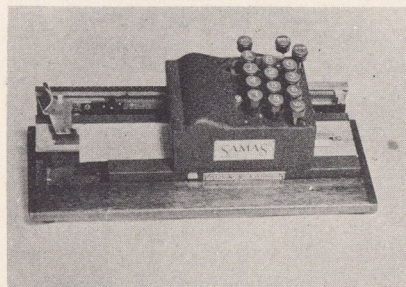


The Pantograph
Punch

The earliest card punching machines were hand operated. Facts were punched into each card according to a definite pattern. A pre-arranged code assigned a particular meaning to each separate position of the card.

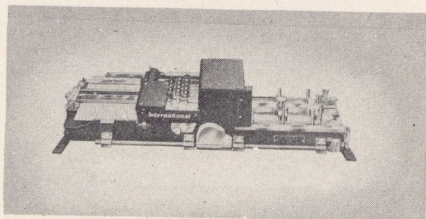


1925 First
Combined Punch
and Typewriter

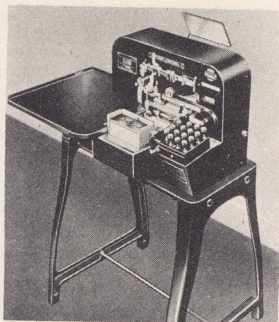


Samas
Hand Punch

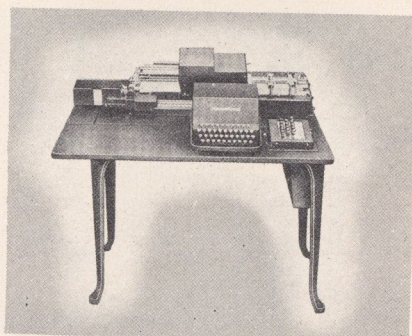
IBM
Numerical Punch



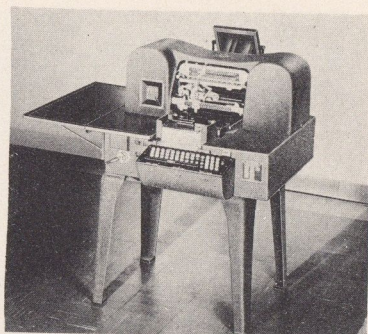
Samas Universal
and Automatic
Key Punch



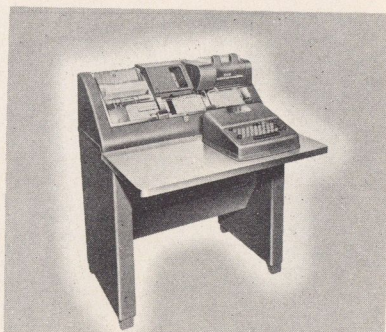
IBM Type 31
Alphabetical
Duplicating Punch



Remington Rand
Automatic Punch



IBM Type 26
Card Punch



Washington, D. C. and there commenced his work on the machines. These were the slide-punch and two-deck horizontal sorter. Mr. Powers' principal contribution to the 1910 census was the Census Punching Machine, of which 300 were manufactured and used. While associated with the U. S. Government, Mr. Powers was granted rights to make application for U. S. patents on his inventions. When his governmental services were completed, he obtained capital and started his own company, the Powers Accounting Machine Company. This company and the machines manufactured was the beginning of the present tabulating machines now produced by Remington Rand, Inc. In 1911, the Powers Accounting Machine Company was incorporated in the State of Maine. He devoted both his full time and his facilities to revising his mechanisms for commercial purposes.

Since the first inventions of Dr. Hollerith and James Powers, tremendous strides have been made in punched card machine accounting equipment. In addition to Hollerith and Powers, men like W. W. Lasker, Sr., Peirce, Walter V. Davidson, and Arthur Pentecost added to the further improvements of the punched card accounting equipment, as well as to the development of systems utilizing this equipment.

A new era in Accounting and Statistics

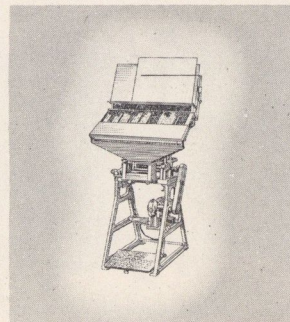
American business and industry were on the threshold of a new era in their office operations. Electric accounting machines had been developed and were being improved upon to meet the needs of business executives for constant control. These machines were being perfected to furnish, with both speed and accuracy, a variety of reports necessary for the satisfactory control of operations and the analysis of the statistical information so vitally needed in the ever increasing complexities of modern business.

Today, business and industry can utilize a greater potential in the application of machine accounting methods through the development of electronics. The use of electronics in business machines is being used successfully and has still greater unforeseeable potentialities. This, along with the use of other magnetic devices with electronic controls and their components to provide greater speed, flexibility and automatism, present a challenge to machine accountants in developing new applications heretofore deemed impossible or impractical.

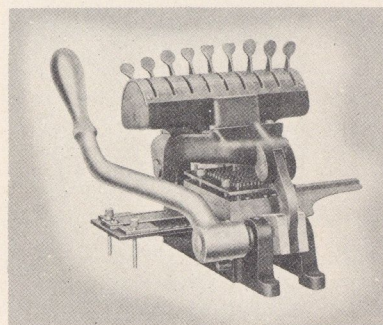
CHRONOLOGY

- 1780 (circa) Joseph Marie Jacquard invents loom control card.
- 1840 (circa) Charles Babbage adapts Jacquard card to statistics control.
- 1880 Dr. Herman Hollerith, statistician, joins staff at U. S. Census Bureau.
- 1886 First Hollerith machines.
- 1890 Hollerith system used for U. S. census. Equipment consisted of pantograph punch and electric counting tabulator with sorting box.

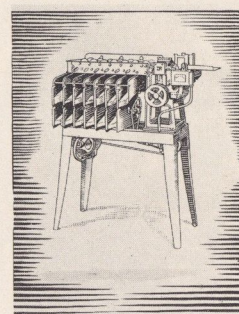
- 1896** Hollerith incorporates his company under the laws of the State of New York as The Tabulating Machine Company.
- 1901** Hollerith introduces basic form of numeric punch keyboard.
- 1907** James Powers goes to U. S. Census Bureau.
- 1910** First Powers machines used in census. Slide-punch, two-deck horizontal sorter developed by Powers.
- 1911** Powers enters commercial field and incorporates under Maine charter.
Merger of The Tabulating Machine Company into Computing-Tabulating-Recording Company (C-T-R).
- 1912** Powers moves to Newark, New Jersey. W. W. Lasker, Sr. joins Powers Company.
- 1913** First Powers Printing Tabulator. Powers opens foreign sales agencies. Hollerith accumulation tabulator, sorter, lever-set gang punch introduced. Machines used for such commercial applications as railroad freight statistics sales analysis.
- 1914** Thomas J. Watson becomes president of Computing-Tabulating-Recording Company.
Powers to Brooklyn. Powers surrenders Maine charter, re-incorporates in Delaware. Dr. Hollerith retires. W. W. Lasker perfects for Powers, the wiring unit, running total mechanism, "designation control," automatic zero device, seven-unit tabulator.
- 1915** Original British company formed — Accounting and Tabulating Corporation of Great Britain, now Powers-Samas Accounting Machines, Ltd., to exploit Powers principles in Britain, its Dominion and parts of Europe.
- 1916** Lasker perfects 12-key keyboard. First automatic numbering attachment. Machines begin work in preparation for World War I.
- 1917** Computing-Tabulating-Recording mechanical verifier and electric key punch developed.
- 1918** Powers machines used for Congressional Committee inquiry into coal strikes.
- 1919** Single deck sorter, "timed sorter," — Powers — developed by Lasker.
British Powers-Samas place Alphabetical Printing Tabulator unit on market.
- 1920** Computing Tabulating Recording buys Peirce patents; introduces its first five-bank tabulator.
- 1921** Powers puts counters on sorter.
Computing Tabulating Recording automatic control for tabulator introduced.
- 1922** Samas Company incorporated in France by British interests.
- 1923** Walter V. Davidson applies machines to food merchandising control — The Chain Store System. Computing Tabulating Recording develops rotary card press.
- 1924** Powers alphabet keyboard. Lasker enlarges tabulator to 10-sector units. Alphabetical tabulator by Powers.



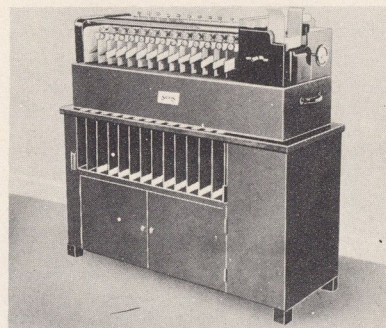
**1908 First
"Die Set" Punch**



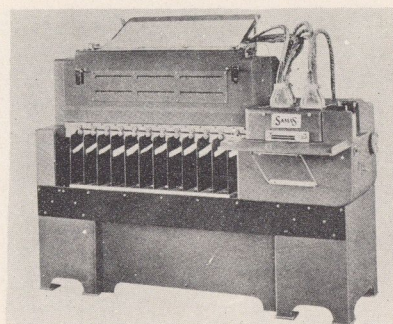
**IBM Type 3
Lever Set
Gang Punch**



**1912 First
Horizontal Sorting Machine**

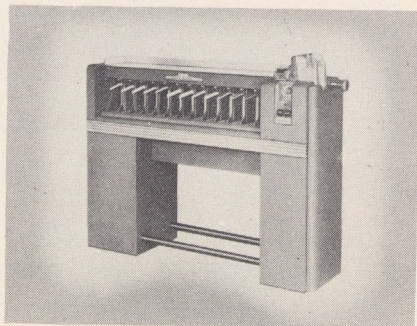


Samas Sorter

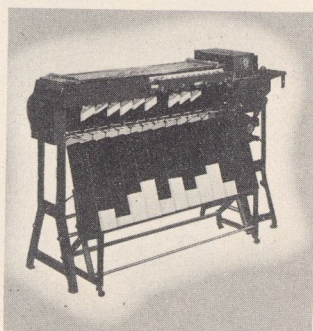


**Samas
Universal
Printing
Counting Sorter**

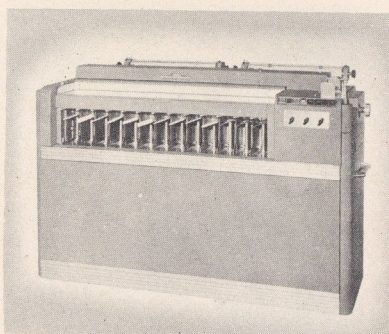
IBM Type 82
Electric
Punched Card
Sorting Machine



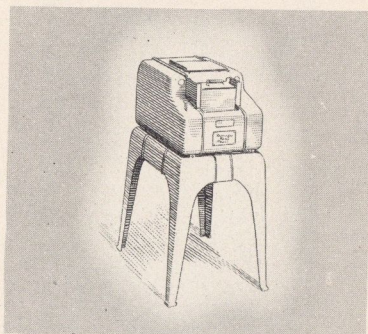
Remington Rand
Automatic Sorter



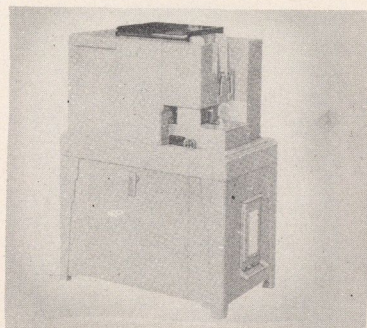
IBM Type 101
Electronic
Statistical
Machine



1929 First
Alphabetical
Interpreter



IBM Type 552
Electric
Punched Card
Interpreter



Computing Tabulating Recording changes name to International Business Machines. Electric duplicating key punch brought out.

- 1925 Electric keyboard punch (Powers). First synchro-matic.
Remington Rand opens San Francisco and Los Angeles offices.
IBM horizontal sorter, type 80.
- 1926 Brooklyn Experimental Laboratory is opened — Powers produces universal automatic control. Mr. Arthur Pentecost is associated with Mr. Lasker.
IBM motor driven gang punch.
- 1927 Powers-Remington Rand merger.
- 1928 IBM introduces its first general purpose accounting machine; 80-column card and equipment; automatic bill feed.
- 1929 Remington Rand sells Statistical Division of Library Bureau.
Model 2 Tabulator on market by Remington Rand. IBM key punch with automatic feed and eject.
Name of British Company changed to Powers-Samas Accounting Machines, Ltd. (now Powers-Samas Accounting Machines (Sales) Ltd.).
- 1930 Remington Rand Model 2 Interpreter and Standard Reproducer.
Stamford plant opened by Remington Rand.
IBM numeric Interpreter.
Introduction by Powers-Samas of small 26-column card ($4\frac{1}{16}'' \times 2''$) and complete line of machines. This was the first change from standard card size ($7\frac{3}{8}'' \times 3\frac{1}{4}''$). Power-Samas introduces Automatic Card Verification by offset hole method and Universal Printing Counting Sorter.
- 1931 Remington Rand 90-column card and equipment. IBM automatic multiplying punch; duplicating summary punch.
- 1931-32 IBM alphabetic accounting machine—all-purpose accounting and document writing machines; alphabetic punch.
- 1932 Remington Rand combines engineering laboratories, moves them to Brooklyn. Automatic compensation feed by Remington Rand.
IBM verifier with automatic feed and eject.
- 1933 IBM opens new research laboratory and new schoolhouse.
Remington Rand introduces 90-column synchro-matic, summary punch; and electric hand punch; opens Canadian office.
IBM alphabetic key punch, type 31; reproducing punch; test scoring machine; alphabetic printing punch.
- 1934 Remington Rand buys assets of United Accounting Machines Company in St. Louis; signs agreement with Siemens and Halskey for sales in Germany. Pentecost and Lasker survey European market.
IBM automatic carriage; alphabetic direct subtraction accounting machine.
Another small card introduced by Powers-Samas, a 21-column card ($2'' \times 2\frac{3}{4}''$) using a smaller round hole $\frac{3}{32}''$ in diameter instead of old standard $\frac{1}{8}''$ diameter hole.

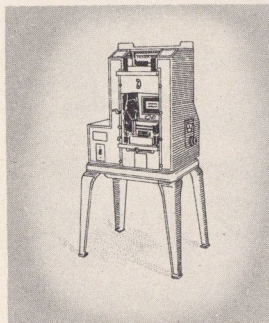
- 1935** Printing Multiplying Punch by Remington Rand. Powers-Samas introduces Summary Card Punch.
- 1936** IBM standardizes on name of "electric accounting machines" as properly descriptive of its products; alphabetic verifier; alphabetic interpreter, col-
lator.
Powers-Samas use the $\frac{3}{32}$ " diameter hole in-
creased 26-column card ($4\frac{1}{16}$ " x 2") capacity to
36-column together with full line of machines.
W. W. Lasker dies. Remington Rand probes pos-
sibilities of direct sales.
- 1937** Powers-Samas use the $\frac{3}{32}$ " diameter hole in-
creased standard 45-column card ($7\frac{3}{8}$ " x $3\frac{1}{4}$ ")
capacity to 65-columns together with full line of
machines.
- 1938** IBM opens World Headquarters building in New
York City.
IBM introduces transfer posting machine; type 513
Reproducing Gang Summary Punch.
Remington Rand produces Multi-Control Repro-
ducing Punch.
First direct Multiplying Machine for Sterling Cur-
rency placed on market by Powers-Samas. New
130-column capacity card introduced by Powers-
Samas using the split card method on the 65-
column card.
- 1939** Remington Rand Model 3 Tabulator.
IBM mark sensing device with electronic tubes.
Numeralpha Interpreter introduced by Powers-
Samas. 130-column capacity card introduced by
Powers-Samas using the new inter-sensing method
on the 65-column card, i.e., 130 columns straight
across the standard card. Combination Automatic
and Visible Key punch introduced by Powers-
Samas.
- 1940** Remington Rand Model 3 Interpreter.
Interpolator placed on market by Powers-Samas.
New 3-Bank Multiple Counting Machine intro-
duced by Powers-Samas.
- 1941** Remington Rand goes into war production.
IBM type 416 accounting machine; tape-con-
trolled card punch; type 404 alphabetic account-
ing machine with multiple line printing from a
single card.
- 1942** Remington Rand inaugurates direct sales program
for tabulating machines.
- 1943** Cross Adding Punch introduced by Powers-Samas.
- 1946** Three-cycle mechanism introduced by Remington
Rand. Remington Rand Tabulating Machines Divi-
sion takes over old Remington Arms Plant at Ilion;
opens Tabulating Machines Institute in Washing-
ton, D. C.
Cross-total application.
IBM type 55 alphabetic verifier; type 602 calcu-
lating punch; type 603 electronic multiplier; card-
tape equipment; type 519 document originating
machine.
"Calculatrice Samas" a direct Multiplying, Divid-
ing, Adding and Subtracting machine introduced
by Samas, France.
- 1948** IBM type 82 sorter; type 602A calculating punch;
types 402-403 accounting machines; type 604



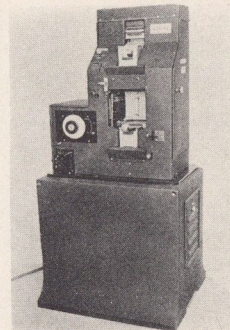
Samas
Interpreter



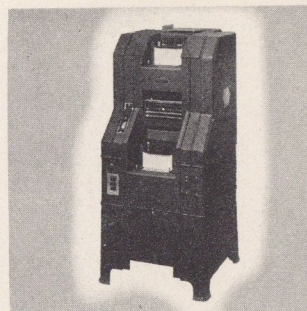
Remington Rand
Interpreter



1930
Reproducing
Interpreter

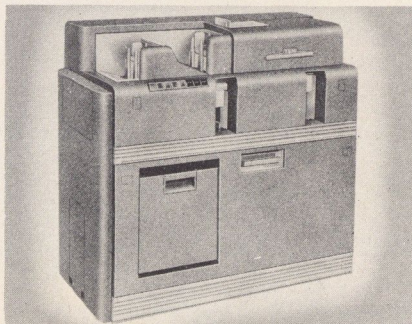


Samas
Reproducing
Punch

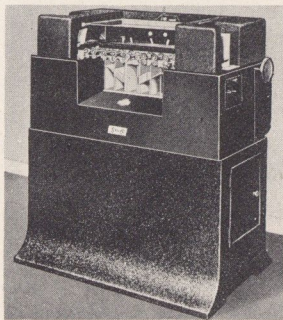


Remington Rand
Multi-Control
Reproducing
Punch

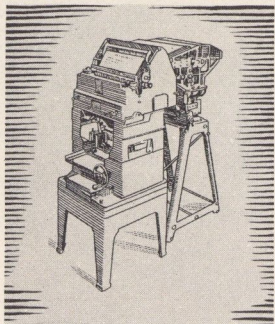
**IBM Type
510 Electric
Document-
Originating Machine**



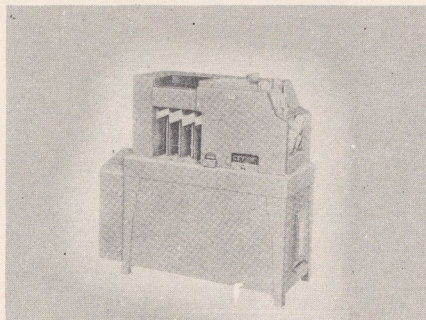
**Samas
Interpolator**



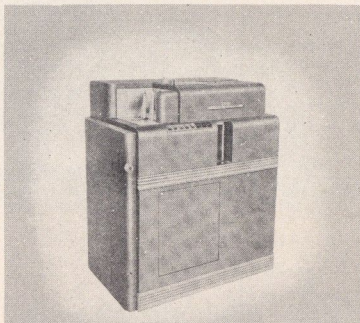
**1931 First
Alphabetical
Tabulator with
Instantaneous
Summary
Punch**



**IBM Type 77
Electric
Punched Card
Collator**



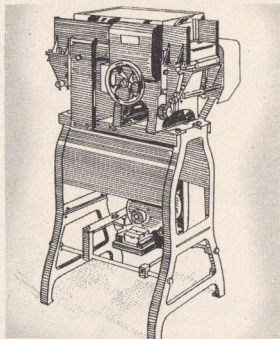
**IBM Type 523
Gang Summary
Punch**



**Samas
Cross-Adding
Punch**



**1932 First
Remington Rand
Verifier**



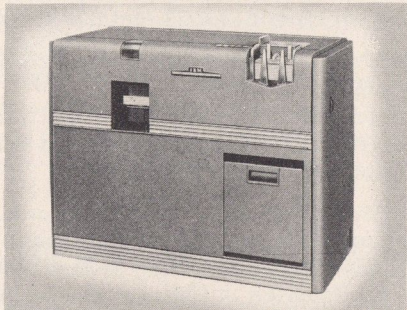
**Remington Rand
Printing
Multiplying
Punch**

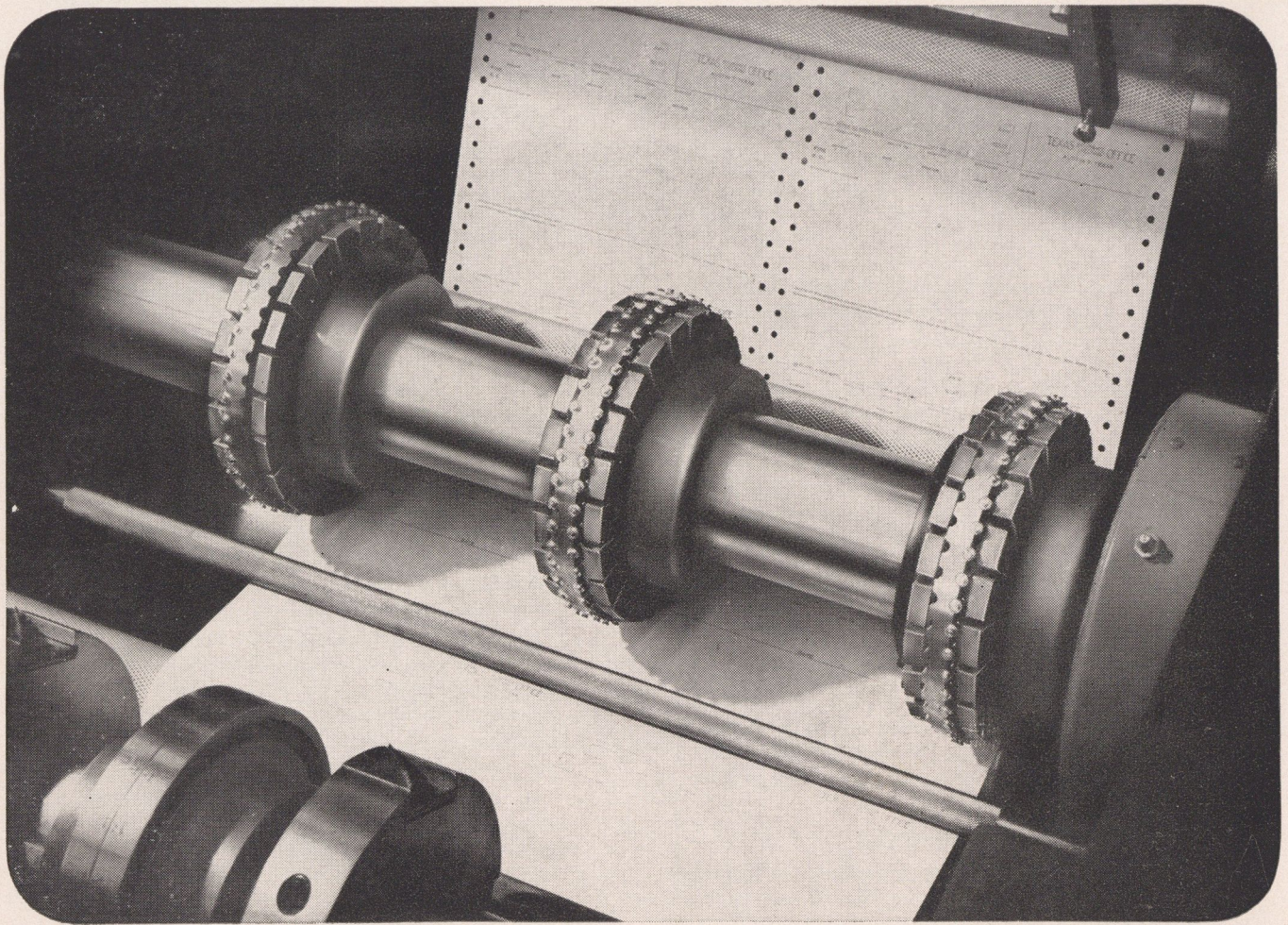


**Samas
Automatic
Verifier**



**IBM Type 602A
Calculating
Punch**





There's a big difference

in Standard Register tabulating forms!

It's the difference in continuous, trouble-free operation they give on your machines!

Know *why*? It's in the particular *ways* Kant-Slip continuous forms are made . . . in the *control* of quality . . . developed out of Standard's unparalleled years of experience in meeting users' *operating* requirements.

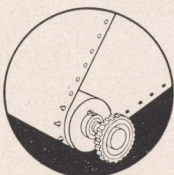
It's in the vital principle that printing, punching (above) and perforating — *in relation to each other* — govern the smooth feeding and precise alignment of continuous forms in writing machines. It's in Standard's ability to print-punch-perforate simultaneously so that these elements are in *constant* relationship throughout *miles upon miles* of forms.

It's in the specifications for interleaved carbons. It's even in careful packing, to bring forms to your machines in perfect condition — to perform as guaranteed under specific written Warranties.

Check the completeness of Standard's Stock Forms line as an immediate answer to many of your forms needs.

Check Standard's unsurpassed line of mechanical equipment: Carbon Separators, Bursters, Burster-Imprinters, etc., to make record-processing completely continuous.

Compare Standard Register's *national* service: specially trained competent Representatives in principal cities; consult your telephone directory. Or write The Standard Register Company, 5300 Campbell St., Dayton 1, Ohio.

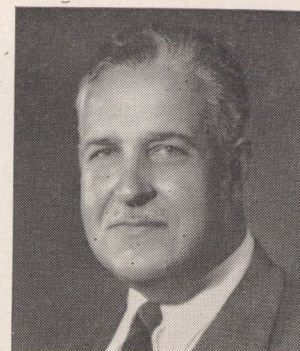


STANDARD REGISTER
Labor-Saving Business Forms and Devices

ORIGINATORS OF marginally-punched continuous forms

Computer with a Memory

By **Lieut. General Leslie R. Groves, USA Ret.**
Vice-President, Remington Rand Inc.



SENSATIONAL SPECULATION on the ultimate future of electronic science has been rampant for many years. Before World War II, pseudo-scientific fiction writers fed the public considerable misinformation on the superhuman feats to be accomplished in the future by man-made robots.

The recent war taught us that electronics could be put to work practically, with results hitherto impossible with mechanical instruments and machines. Radar to warn of approaching enemy craft. Guided missiles which unerringly find their targets by correcting automatically their own deviations in flight. Devices to compute performance possibilities of all sorts of weapons. These are but a few of the strides made by electronic scientists under wartime research.

Electronics For Mathematics

With the return to peacetime, these scientists turned their talents to putting electronics to work in other fields. Soon the public began to hear of miraculous machines which solve complex mathematical problems in a thousandth of a second, accomplish in ten minutes what a staff of human geniuses would take as many days to work out. Devices said to "think" 12,000 times faster than man.

Electronics of itself is, of course, spectacular. It appeals to the popular imagination. Its importance to commerce, however, lies not in its glamour, but in the economics which may be realized by its proper application.

So far most of the publicity on electronic machines had told of purely academic or military accomplishments. What about their commercial applicators?

At Remington Rand's Laboratory of Advanced Research at South Norwalk, Conn., scientists have been asking themselves the same question — as they patiently and painstakingly carry on their explorations in practical electronic research for American business administration.

These men are not content to develop a newfangled, spectacular "gadget" just for development's sake. Their constant questions are: "What will it do? Where will it fit into the world of business? What will it accomplish for our industrial economy?"

And along with their own activities, they have kept in close touch with the work being carried on by other men devoting their careers to similar investigation.

About the Author

Lieut. General Leslie R. Groves, USA Ret.
Vice-President, Remington Rand Inc.

Lieut. General Leslie R. Groves, USA Retired, head of the wartime atom bomb project and now vice-president and director of Remington Rand Inc., in charge of advanced research, has had a varied career as a military man, scientist and business executive.

After a 30-year career in the regular Army, General Groves retired two years ago to devote himself to directing problems of scientific development for Remington Rand in the field of advanced research in which his Company holds an ever strengthening position.

In addition to general research at the Remington Rand Laboratory for Advanced Scientific Research at South Norwalk, Conn., which he heads, General Groves also is coordinating the development of the "electronic brain" project which his Company has taken over with the acquisition of the Eckert-Mauchly Computer Corporation of Philadelphia.

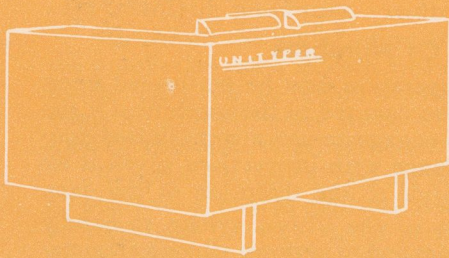
He was educated at the University of Washington, Seattle, Wash., and later at Massachusetts Institute of Technology from 1913 to 1915. The following year he won a Presidential appointment to the United States Military Academy at West Point, N. Y., and after graduation was commissioned a second lieutenant in the Corps of Engineers on November 1, 1918.

During the next few years he studied at the Army Engineer School and served in various assignments in the United States, Hawaii, Europe and Nicaragua. In 1936 he was graduated from the Command and General Staff School at Fort Leavenworth, Kansas. He later attended the Army War College from which he was graduated in 1939.

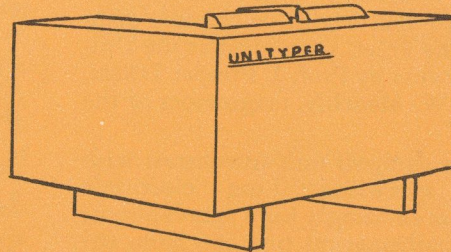
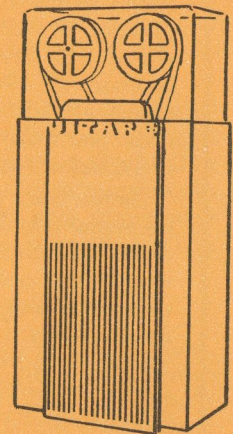
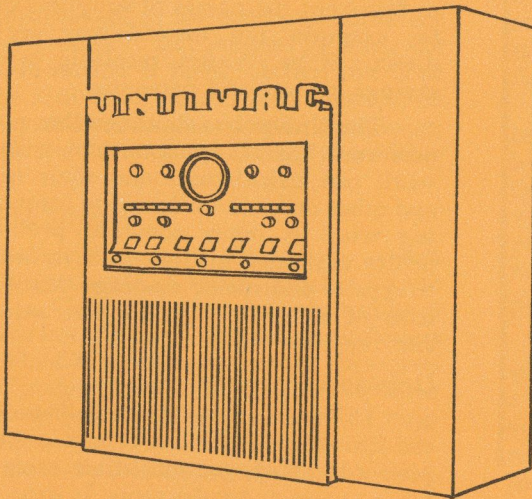
He was then assigned to the War Department General Staff and became a special assistant to the Quartermaster General in connection with the Army construction program. He became a Colonel a few months later, being promoted over thousands of senior officers.

In 1941 he became Deputy Chief of Construction for the Corps of Engineers, directing all military construction operations in the United

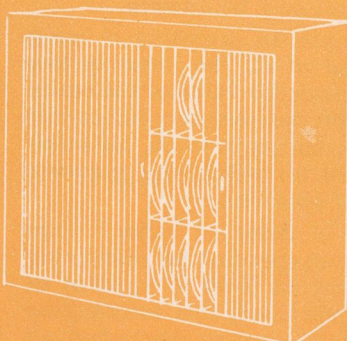
Continued on Page 18



Univac's actual operation is simple. The Unityper records instructions and data on reels of magnetic tape. Its keyboard is similar to a standard typewriter and can be operated by any typist.

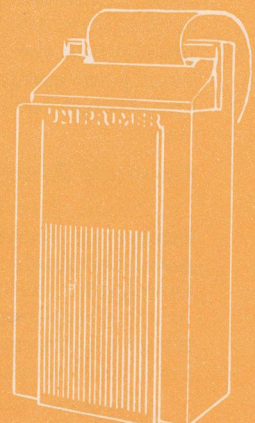


Univac executes instruction, records them on magnetic tape. Its operation is completely automatic. It occupies no more floor area than a large desk. It sorts and collates and performs computations.



Data is stored in the Unifiler on magnetic tape, each reel capable of recording one million digits. Information can be stored indefinitely, altered when desired, used when needed.

The Uniprinter automatically types on paper or stencils information it reads from magnetic tape reels, providing permanent records of the Univac's computations.



About the Author *Continued*

Lieut. General Leslie R. Groves, USA Ret.

States including camps, ordnance plants, ports, depots and the Pentagon Building in Washington, D. C.

His assignment as head of the Manhattan Project occurred in 1942, after he had been promoted to Brigadier General. For three years he was in responsible charge of all phases of the atom-bomb development leading up to the explosion at Hiroshima, Japan, in 1945. He remained head of the Manhattan Project until January 1, 1947, when atomic energy affairs were turned over to the civilian Atomic Energy Commission.

On March 9, 1944, General Groves was promoted to the rank of Major General and on January 24, 1948, to Lieutenant General. He retired from the Army with the latter rank on February 29, 1948, after serving a year as chief of the Armed Forces Special Weapons Project under the Chiefs of Staff of the Army and Air and Chief of Naval Operations.

He has been awarded the Distinguished Service Medal and the Legion of Merit by the United States and also has received numerous foreign decorations and citations, including the Nicaraguan Presidential Medal of Merit and the Belgian Order of the Crown (Commander), and was enrolled as an Honorary Companion, Most Honorable Order of the Bath, in Great Britain. He received honorary doctorates from the University of California, and Lafayette, Williams and Hobart Colleges.

As a result of this practical inquisitiveness, Remington Rand has now added to its widely diversified line of business machines, the Univac, latest refinement of the original electronic computing machine, the Eniac, developed at the University of Pennsylvania by Prof. J. Presper Eckert, Jr., and Dr. John W. Mauchly, originators of the "electronic brain."

The Univac, a compact unit in contrast with the other giant, sprawling 30-ton "electronic brains," can solve at amazingly high speeds almost any conceivable mathematical problem from the simplest business arithmetic to the most complex problems in ballistics, actuarial statistics, astronomy, aeronautical engineering, nuclear physics and the like. But its function extends beyond pure computation. The Univac can classify and arrange both decimal and alphabetic information.

Univac's Amazing Speed

With Remington Rand's production and marketing facilities, this truly universal automatic computer will be available to business men throughout the world. The Univac can accomplish in a few days, with a handful of personnel, work which otherwise would require a staff of 40 people for several months.

Business and economic trends, as well as scientific data, can be analyzed and recorded. Accounting and statistical problems are solved swiftly and accurately from data formerly too

complex for ordinary computing machines.

Sorts Names Or Numbers

A single operation may be performed upon each entry of the data fed to the machine. Or the computer may engage in more complicated routines in accordance with instructions given it by the operator prior to the reception of the data.

The ability of the Univac system to handle alphabetic entries and to perform all logical operations upon them permits it also to sort lists of names, products, catalogue items, chemical formulae and the like. Since the machine can operate upon alphabetic entries with the same facility that it handles numbers, the coding of information prior to its entry into the Univac is simplified. The user is no longer required to assign numbers to represent the names of suppliers or customers, for example, but instead may use the names directly if he chooses, resulting in considerable savings in time and personnel.

The Univac has almost endless potential business uses: Payroll computations with their many work rate calculations and their numerous tax and other deductions. Intricate insurance accounting with its many actuarial problems. Public utility customer billing with its numerous rate structures and meter readings. Management controls of inventory, production, sales, personnel and the like.

Univac's Memory

There is no mathematical problem which the Univac cannot solve. It adds, subtracts, multiplies and divides at incredible rates of speed. It takes square and cube roots. It sorts and collates. And it remembers.

Most amazing of all of Univac's accomplishments is its "mercury memory." Its large internal register holds within the computer not only those digits of the data which are undergoing computation but the instructions concerning the computation as well. A maximum of 1,000 registered "memories" can be retained by the machine at one time through sound waves traveling through a tube or column of mercury.

Electrical pulses circulate through this Acoustic Delay-line memory, as it is called, at a rate of more than a million a second and may be repeatedly passed through as long as desired. When the numbers have been withdrawn for use in computing activities they may easily be cleared so that new information may be entered.

Suppose, for example, an inventory is being studied to obtain a list of all the items in low supply and to obtain the dollar value of the entire inventory. Each entry on the inventory list carries the item number, the quantity in stock, the minimum quantity specified for reordering purposes and the dollar value of each item.

First the number of items on hand is compared with the minimum specified for reordering purposes. If the amount on hand is equal to or less than the amount specified, this information is recorded on a separate tape so that when all items have been inspected this tape will have recorded on it, by part numbers, all items in short

supply.

To obtain the dollar value of the inventory, the number of items in each entry are multiplied by the unit cost to obtain a subtotal. The subtotals for all entries are added to obtain a grand total of the value of all stock on hand.

Suppose ten instructions are needed to specify all operations, such as multiplication, comparison, addition and the like, to be performed on each entry. This set of instructions is given to the computer only once, no matter how often it may be used. The "memory" does the rest.

Much more complicated instructions can be handled by the machine for bookkeeping procedures, for example. Each entry can be inspected according to a comparison procedure to determine which of a number of operations should be performed. The instructions for each procedure are stored in the "memory" and referred to when the designated subroutine is being carried out. The ability of the Univac to make routine tests upon entry data to determine the proper computing procedure results in a great saving in routine personnel.

Operation Is Simple

The actual operation of the Univac system is comparatively simple. A typist punches on the keyboard of a Unityper, a device not unlike a regular typewriter, data and instructions in letters and figures. The Unityper records coded characters on reels of magnetic tape in much the same manner as a teletype machine operates. The magnetic tape feeds the information to the Univac at a rate of more than 10,000 characters a second.

The computer executes the instructions at electronic speed and records results on magnetic tape. At the same time it checks its own answers at every step, not only for accuracy of figures but for names as well.

When the calculations for a given procedure are completed another unit in the system, the Uniprinter, automatically types or stencils in any desired form the results of the operation as a permanent record.

Data, results and instructions for future reference are kept in the Unifile, a storage unit, on reels of magnetic tape. Each reel contains as

many as a million digits. When a problem of a type requiring stored data is to be worked, directions for its solution are taken from the Unifile and placed in the Univac. These magnetic tapes can be used over and over, erased and reused completely, or altered when necessary.

Made of extremely high tensile metal alloy, these tapes are difficult to break or damage and are resistant to the usual hazards of water, extreme heat or cold, or high humidity.

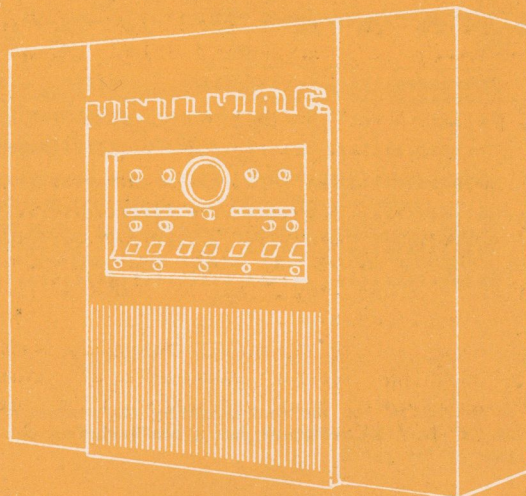
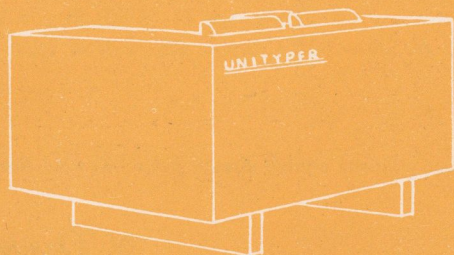
Univac is, in every sense of the word, the complete computing system which its originators call it.

The prototype of the Univac, the Binac, produced by Prof. Eckert, and Dr. Mauchly, was originally capable of performing 500,000 additions and 200,000 multiplications in two hours. Its capacity has since been increased so that today it can make thousands of mathematical calculations a second.

The Eckert-Mauchly designed Eniac is currently being used at Aberdeen Proving Ground in Maryland by the Weapons System Evaluation Group, new arm of national defense research, to work out complicated ballistic and interceptor problems and to provide a table of probable loss rates.

Practical Electronic Research

The Eckert-Mauchly Computer Corporation, which the two Univac inventors head, has become a subsidiary of Remington Rand Inc. Its research and development activities are being coordinated with the practical electronic research for business long underway at the South Norwalk Laboratory of Advanced Research with an objective to produce, not just solutions to interesting academic problems, but new means to help the business man meet the ever-growing complexities of industrial and commercial administration.



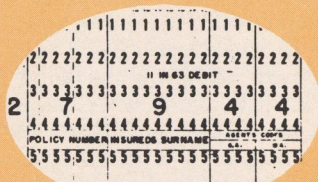
Something for Nothing

for your Tabulating Card Cost Dollar

By F. C. Heidemann,
Chief Accountant,
Guarantee Mutual Life Insurance Company,
Omaha, Nebraska

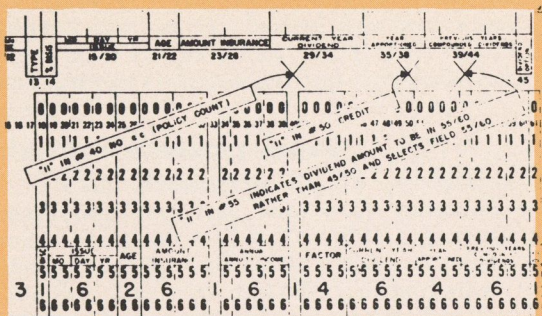
The following advantages are FREE to all users of Tabulating Cards. In addition to being an AID to the key punch operator, they will also assist the machine operator or clerk working with the cards. It necessitates only taking full advantage of the possibilities in proper card design.

Card Field Size



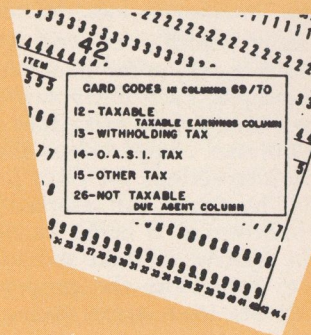
A large numeral denoting the number of digits in each card field shown directly above the card field title, avoids the necessity of the key punch operator counting, to determine the number of zeros to be punched ahead of a figure in order to fill out the field.

Selection Punches



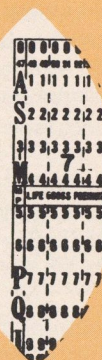
A printed "X" on the card indicating the position of an "X" or "11" overpunch plus a box explaining purpose of the punch.

Selection Control Punches For Multiple Use Cards



Box set out in the card design, indicating in legend form the selection control punches and their purpose.

Oversize Code Characters



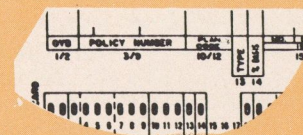
Large alphabet code characters make memorizing codes unnecessary.

For example:

A—Annual
S—Semi Annual
Q—Quarterly
M—Monthly

More important large alphabet or numerical code characters automatically attract the individuals eye when "eye checking" sorted batches or individual cards.

Interpreter Type Bars



Type bar positions printed directly below the card field title.

Dual Interpreting of a Card

A card designed to be interpreted, either on IBM Type 552 Interpreter, or on IBM Type 26 Printing Punch.

Common Date Source

Date Source in a Heading Card design, denoted by a Shaded Area.

[illegible]

A Utility Summary Card designed with various capacity fields. The number of digits in each field is denoted by Large Numerals.

Unused Columns of the Card—Blank

Blank columns in the card design indicate NO HARM will OCCUR, if punched holes are present, as a result of duplication or direct key punching.

To those readers who are now thinking to yourselves that this is nothing new or which I did not already know in the above, I ask:

"Do you take advantage of similar ideas when designing an electrotype?"

"Are you getting full money value for your Punch Card dollar?" If so, swell!

To you whom the ideas illustrated in this

article are new or ones which you are not NOW taking advantage of, I say:

"Think them over!"

We here at the Guarantee Mutual Life Company have tested them and they have proven definitely to have merit. We are hopeful that they may be of value as an aid in Tabulating Card design.

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Order and Invoice Writing

by A. J. WALTHER

THE LUFKIN RULE COMPANY is a large manufacturer of tapes, rules, precision instruments and gages. The active finished products number approximately 3500 different items each month.

The Tabulating installation consists of 3 IBM Alphabetic Printers and a number of other auxiliary machines. The monthly card consumption is 365,000.

The punched-card application is initiated with the receipt of the customer's order. Pre-punched cards are utilized, as the information required is highly repetitive in nature. The Product Card tub files include cards for each regular product containing all information pertinent to the item, except quantity and price. Quantity cards contain just the quantity and controlling X punches and are stored in the Product Card tub files. Name and Address Cards for all regular customers are pre-punched. A code number is assigned to each customer which, when sorted by code, automatically alphabetized the file. Terms cards contain a Lufkin order number and the popular terms of 2/10. The Name and Term Cards are used throughout all operations. This includes use as a control and a reference for all orders which contain back order items and which might be held on file for several weeks.

The tub files are replenished by a signal from a Marker Card which also indicates the amount of cards per product, quantity, or address to be made up.

Customers are assigned a price base and terms code. The Master Price Cards reflect this combination of prices and through the use of a one column price base code gang-punched in the Product Card, the pricing of the products is done on a selective basis in a Calculating Punch (type 602) simultaneously with net extensions for invoicing. This also gives the flexibility required when there are price fluctuations and also where a large back log of orders exist.

Order Writing and Back Order Writing is done on a daily basis. Invoice Writing is done immediately after shipments of products have been made. Most reports are on a monthly basis with others being prepared at shorter intervals or at special periods. Approximately ninety per cent of them are a by-product of Order and Invoice Writing.

Order Writing

CUSTOMER ORDERS are received in the Sales Department where they are edited and at the same time indicate the price base and terms in a space provided.

about the author



As has been evidenced in his article, Mr. A. J. Walther has had an extensive background in tabulating. In fact, 17 years in total. Eleven of these years were spent with a Chicago Business Forms firm, where he was supervisor of that installation. His background there included statistical sales, and payroll taxes as applied to punched card accounting. In 1945, he joined the Lufkin Rule Company as Supervisor of the tabulating department. He enjoys a membership in the National Association of Cost Accountants.

Upon receipt of the orders in the Order Invoice Department, they are sorted alphabetically, coded, and stamped with a numbering machine, indicating Lufkin's order number. Pre-Punched Name Cards and pre-punched Terms' Cards corresponding to the numbers previously stamped on the orders are pulled from the tub files. The Terms Card is inserted in the back of each Name set.

Customer Number, City and State code is gang punched into the Terms Card from the Name Cards. The date entered is emitted at the same time. The cards are then separated and returned to the key punch operators where the Customer's order number and other pertinent data is punched into the Terms Card. "Ship To" Cards are also punched at this station. The original order and cards are returned to the Order Invoice. Quantity and Product Cards are pulled from the tub files for each order and are audited for correct pulling.

The assembled cards for each order are then processed on the Reproducer (type 513). Order number, customer account number, city, state and price base code is gang punched into all the cards and the quantity is punched into the Product Card only. The cards are tumbled and the Product Card information is gang punched into the Quantity Card. The Quantity Cards are removed from

the other cards by means of selection and held for other analysis reports on incoming orders, thus becoming the by-product of Order Writing.

The remaining assembled cards are used to write the order on the Tabulator (type 405) and returned to the Order Invoice Department, to be filed in the Unshipped or Back Order file.

The written orders are distributed by the Order Invoice Department. A set of three copies, the Invoicing, Label and Packing are sent to the Shipping Department. The File copy to the files and the Salesman's copy to the Salesman.

A few of the reports run from the Quantity Card are as follows:

1. Requirement Report
2. Report of Daily Order Classifications
3. Daily, Weekly, Monthly and Yearly reports by Product, (dollar value and quantity)
4. Forecast Analysis

Invoice Writing

AFTER an order is shipped, the Invoice copy of the order is returned to the Order Invoice Department. The Shipping Department designates the quantity and items back ordered as well as the transportation charged for the shipped items.

Cards originally used to write the order are pulled from the Un-shipped file. The shipped items are sorted by product code number and merged with Price Masters. With the use of the price base code gang-punched in the Product Card, the pricing is done on a selective basis in a Calculating punch (type 602) simultaneously with net extensions for invoicing. The cards are rerun through the 602 to verify the price and extension and at the same time verifying the product code of the Master Price Cards and the following detail Product Cards. The detail Cards are then sorted by order number and customer number, to reassemble with the Name and Term cards. Miscellaneous charges such as postage, etc. are pulled from a pre-punched file and inserted in the assembled deck of cards, and then routed to the Tabulating Department for Invoice Writing.

The insurance, necessary on some shipments is automatically accumulated in the Alphabetic Printer (type 405) and signaled to print when a Postage and Insurance card appears. This is done through the use of a counter rolling device installed in the IBM 405 machine.

An Accounts Receivable Summary Card is produced for each invoice. This card is used for balancing and control purposes at the present time, but could be used for a mechanized system of the Receivables. The Invoice form was designed for insertion in a window envelope and for a minimum number of folds (one).

When the day's invoicing has been released, the Heading, Postage and Product cards are separated. The Heading cards are used for writing a Back Order when necessary. The Postage cards are balanced to a control and returned to the Tub file for future use. The Product cards are balanced to the Accounts Receivable Control and accumulated for the month.

about the company

The Lufkin Rule Company is one of the leading manufacturers of precision tools, measuring tapes, and rules of every description. With their main office and factory located in Saginaw, Michigan, they also maintain an office in Barrie, Ontario. These, in addition to an office and warehouse in New York City. Products as manufactured by the Lufkin Rule Company are distributed internationally.



Listing Invoices



Product Card Tub Files

THE LUFKIN RULE CO.

CUSTOMER'S ORDER

TERMS
NET 30 DAYS

SAGINAW, MICHIGAN

DATE ENTERED

BACK-ORDER

FROM ORDER NO. PAGE NO.

ABC123456

2 10 DO MRO

011552
MO. DAY YR.

258963

1

SHIP
TO

HARRIS SUPPLY COMPANY
123 MAIN STREET
P O BOX 501
ORDER NO B1950
DETROIT MICHIGAN

ORDERED
BY

A D BLACK AND COMPANY
19501 WASHINGTON AVE
CHICAGO ILLINOIS

DATE SHIPPED

DATE BACK-ORDERED
11552
MO. DAY YR.

FRT.

EXP.

P. P.

INS.

CHECKED BY

RE-CHECKED BY

PACKED BY

B12345

CATALOG NUMBER AND DESCRIPTION

QUANTITY
ORDERED

UNIT

QUANTITY
SHIPPED

QUANTITY
BACK-ORDERED

910A

PARALLEL CLAMPS

1

PR

1

25 12 IN

COMB SQUARE

6

EA

1

006 LEAF FOR 126T

1

EA

1

FACTORIES AND GENERAL OFFICES
SAGINAW, MICHIGAN, U. S. A.
BARRIE, ONTARIO, CANADA

THE LUFKIN RULE CO.

SAGINAW, MICHIGAN

BRANCH OFFICE AND WAREHOUSE
132-138 LAFAYETTE ST.
NEW YORK 13, N. Y.

CUSTOMER'S ORDER NO.

TERMS
NET 30 DAYS

ABC123456

2 10 DO MRO

DATE SHIPPED
MO. DAY YR.
11552

OUR ORDER NO.

INVOICE NO.

PAGE NO.

258963 303400

1

SHIPPED
TO

HARRIS SUPPLY COMPANY
123 MAIN STREET
P O BOX 501
ORDER NO B1950
DETROIT MICHIGAN

SOLD
TO

A D BLACK AND COMPANY
19501 WASHINGTON AVE
CHICAGO ILLINOIS

B12345

Manufacturers of
PRECISION TOOLS
MEASURING TAPES
RULES

CATALOG NUMBER AND DESCRIPTION

QUANTITY

UNIT

UNIT PRICE

NET EXTENSION

DISCOUNT
PER CENT

SHIPPED VIA PARCEL POST
138CX DIE MAKERS SQUARE
2504 24 IN COMB SQUARE BLADE
778 RADIUS GAGE SET
718 CENTER PUNCH

12

EA

9.99

107.88

10

1

5

EA

9.99

49.95

10

1

2

EA

9.99

17.98

10

1

1

EA

9.99

8.99

10

1

179.80

*

PSTG AND INSURANCE

- 1—Date emitted by digit selector
- 2—Pre-numbered
- 3—Same cards used in writing the order
- 4—Items shipped
- 5—Actual Postage 18c Insurance automatically accumulated at .1% of total and added to postage.

THE LUFKIN RULE CO.

CUSTOMER'S ORDER

TERMS
NET 30 DAYS

SAGINAW, MICHIGAN

DATE ENTERED

ORDER NO.

PAGE NO.

ABC123456

2 10 DO MRO

011552
MO. DAY YR.

258963

1

SHIP
TO

HARRIS SUPPLY COMPANY
123 MAIN STREET
P O BOX 501
ORDER NO B1950
DETROIT MICHIGAN

ORDERED
BY

A D BLACK AND COMPANY
19501 WASHINGTON AVE
CHICAGO ILLINOIS

B12345

FRT.

EXP.

P. P.

INS.

CHECKED BY

RE-CHECKED BY

PACKED BY

CATALOG NUMBER AND DESCRIPTION

QUANTITY
ORDERED

UNIT

QUANTITY
SHIPPED

QUANTITY
BACK-ORDERED

910A

PARALLEL CLAMPS

1

PR

1

25 12 IN

COMB SQUARE

6

EA

1

006 LEAF FOR 126T

1

EA

1

138CX

DIE MAKERS SQUARE

12

EA

1

2504 24 IN

COMB SQUARE BLADE

5

EA

1

778

RADIUS GAGE SET

2

EA

1

718

CENTER PUNCH

1

EA

1

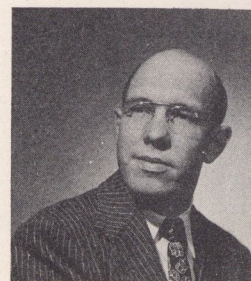
KEY

- 1—Key punched and Pre-numbered
- 2—Key punched
- 3—Pre-punched
- 4—Customer's Account Number
- 5—Pre-punched

Payroll Accounting

By L. J. Manz
Tabulating Supervisor,
McKesson and Robbins, Inc.,
Bridgeport, Connecticut.

... About the
Author:



Mr. L. J. Manz can boast of a long record of employment with McKesson & Robbins Inc., at Bridgeport, Connecticut. In 1934, he worked in the Receiving Department and shortly thereafter was promoted to Receiving Clerk in that same office. In 1940, an opportunity was presented whereby he transferred to the Tabulating Department. Since that time he progressed from Group Leader to Assistant Supervisor, and in March 1948, was promoted to Supervisor of that installation. In addition to his extensive tabulating background, Mr. Manz studied accounting at the University of Bridgeport and attended special machine accounting seminars at I.B.M. schools.

... About the Company:

McKesson & Robbins are one of the leading wholesalers in their field. They deal primarily in three types of products: drug-store and hospital merchandise, wines and liquors, and industrial chemicals. With McKesson & Robbins warehouses throughout the country, they are able to serve many thousands of retailers to expedite the distribution of their products. It follows, therefore, that good service to their customers is the cornerstone upon which McKesson & Robbins is built.

THE WEEKLY factory and office payroll envelopes and related payroll reports are prepared in the Tabulating Department by applying factor master cards and time clock hours as recorded on each employee's time card. The factor master cards are maintained with current adjustments for each payroll week according to "Advice of Changes" listings forwarded by the Payroll Department and the Federal Credit Union clerk. Employee hours according to the type of earnings are calculated on the time cards by the Payroll Department and forwarded to the Tabulating Department in groups as follows:

Absentees

Consists of employees not included in the payroll because of absence, advance payment or miscellaneous adjustments.

All Other

Consists of employees included in the payroll. Taped totals for payroll controls are attached to the following clock number groups: #1 to #199; #200 to #370; #371 to #589; #590 to #999; #1000 and over (Office Payroll)

The following types of earnings and codes are in use:

Regular	0
Time and one-half	1
Vacation	2
Piece Work	3
Miscellaneous Adjustment	5
Double Time	6
Night Time	7
Night Time and one-half	8
Night Double Time	9

Payroll Master Card Files

Employee Master Cards: Employee Master Cards are maintained for each employee of the factory and office payroll, removing or adding only upon written advice from the Payroll Department. Card contents are as follows:

Employee Name	1-19
Job Code	20-22
Service Differential %	23-24
Social Security Number	26-34
Date Employed	35-40
Calculation Rate	41-46
Job Level	47
Department	48-49
Clock Number	50-53
Base Rate (w/o S. D.)	54-57
Date of Birth	59-64
Salary (Office Only)	65-66, 73-74
Termination Date	67-72
"X"	75
Withholding Tax Class	78-79
Sex Code (Male-4, Female-6)	80

Withholding Tax Master Cards: Master Cards contain pre-determined withholding tax amounts for each exemption class according to various gross earnings amount brackets, up to \$98.00. Tax amounts for gross earnings exceeding \$98.00 are prepared manually using the prepared tax tables. Card contents are as follows:

Tax Amount	35-38
"O"	40
"X"	50
Gross Earnings	63-64
"X"	75
Withholding Tax Class	78-79

Earnings Rate Master Cards: Master cards contain pre-determined earnings rates according to each type of earning and for each base rate including service differential percentages. The following types of earnings, their codes, and percentages are in use:

Type	Code	%	Alphabetical Description
Overtime	1	150	"O"
Double Time	6	200	"D"
Night Time	7	110	"N"
Night Time Overtime	8	165	"N"

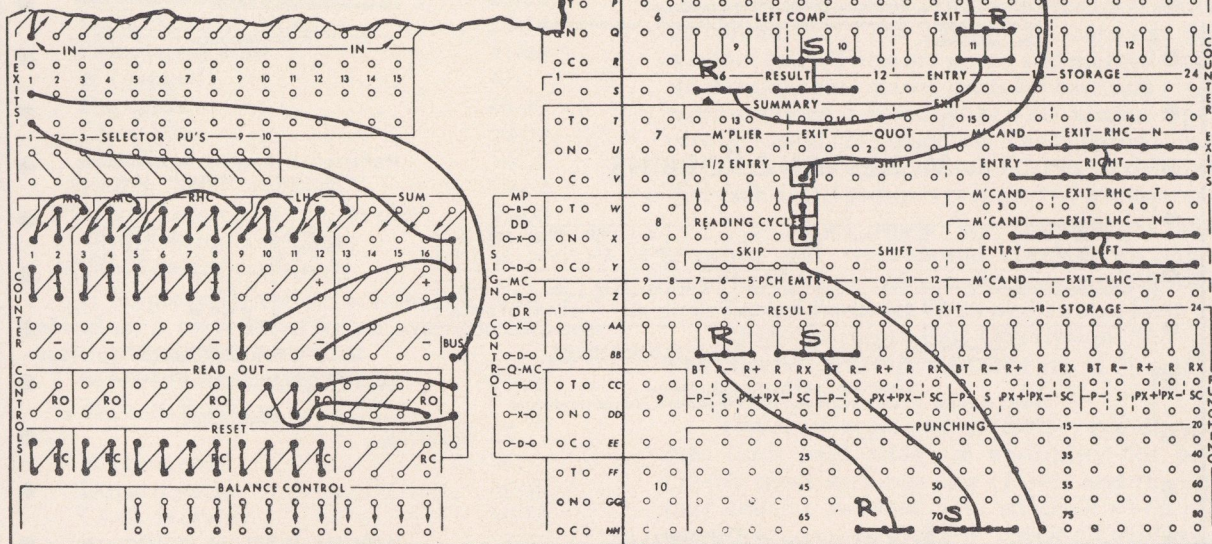
the Punched Card

$$(A \times .015 = R) \text{ and } (A - B - R = S)$$

All possible earnings are illustrated for sample purposes only:

4000 Hours	Regular Time	
800 Hours	Overtime	150%
800 Hours	Double Time	200%
800 Hours	Regular Night	110%
800 Hours	Night Overtime	165%
800 Hours	Night Double	220%

S.D. % used is 7½% plus for five years or over service with the company.

[illegible]

Payroll Envelope Card

Payroll Register Detail Card

CLOCK NO.	DATE PAID	GROSS WAGES	HOURS	PERIOD ENDED	S.O. %	SOCIAL SECURITY NUMBER	F.R.I.	WITHHOLDING TAX		ST.P.	DEDUCTION		TOTAL DEDUCTIONS	NET PAY	DOLLAR AMOUNT
								FEDERAL	STATE		FEDERAL	STATE			
000000	00	00	00	00	00	000000		00	00	00	00	00	00	00	00
111111	11	11	11	11	11	111111		11	11	11	11	11	11	11	11
222222	22	22	22	22	22	222222		22	22	22	22	22	22	22	22
333333	33	33	33	33	33	333333		33	33	33	33	33	33	33	33
444444	44	44	44	44	44	444444		44	44	44	44	44	44	44	44
555555	55	55	55	55	55	555555		55	55	55	55	55	55	55	55
666666	66	66	66	66	66	666666		66	66	66	66	66	66	66	66
777777	77	77	77	77	77	777777		77	77	77	77	77	77	77	77
888888	88	88	88	88	88	888888		88	88	88	88	88	88	88	88
999999	99	99	99	99	99	999999		99	99	99	99	99	99	99	99
101010	10	10	10	10	10	101010		10	10	10	10	10	10	10	10
111111	11	11	11	11	11	111111		11	11	11	11	11	11	11	11
121212	12	12	12	12	12	121212		12	12	12	12	12	12	12	12
131313	13	13	13	13	13	131313		13	13	13	13	13	13	13	13
141414	14	14	14	14	14	141414		14	14	14	14	14	14	14	14
151515	15	15	15	15	15	151515		15	15	15	15	15	15	15	15
161616	16	16	16	16	16	161616		16	16	16	16	16	16	16	16
171717	17	17	17	17	17	171717		17	17	17	17	17	17	17	17
181818	18	18	18	18	18	181818		18	18	18	18	18	18	18	18
191919	19	19	19	19	19	191919		19	19	19	19	19	19	19	19
202020	20	20	20	20	20	202020		20	20	20	20	20	20	20	20
212121	21	21	21	21	21	212121		21	21	21	21	21	21	21	21
222222	22	22	22	22	22	222222		22	22	22	22	22	22	22	22
232323	23	23	23	23	23	232323		23	23	23	23	23	23	23	23
242424	24	24	24	24	24	242424		24	24	24	24	24	24	24	24
252525	25	25	25	25	25	252525		25	25	25	25	25	25	25	25
262626	26	26	26	26	26	262626		26	26	26	26	26	26	26	26
272727	27	27	27	27	27	2727									

FORM NO. 212-1

McKesson Laboratories
BRIDGEPORT 9, CONN.

PAYROLL REGISTER

WEEK ENDED

CLOCK NO.	EMPLOYEE	TOTAL HOURS	BASE RATE	S. D. %	GROSS WAGES	F. I. C. A. TAX	WITHHOLDING TAX	BONDS	CREDIT UNION	GROUP INSURANCE	MISC. S. & K.	M. L. A.	NET WAGES
1234	DOE JOHN	4000	100	75	4300	174	1070	200	1234	108	175	10	8596
1234		800	0	100	75	1290							
1234		800	0	100	75	1720							
1234		800	N	100	75	946							
1234		800	N	100	75	1419							
1234		800	N	100	75	1892							

All possible earnings are illustrated for sample purposes only:

4000 Hours Regular Time	
800 Hours Overtime	150%
800 Hours Double Time	200%
800 Hours Regular Night	110%
800 Hours Night Overtime	165%
800 Hours Night Double	220%

S. D. % used is 7½% plus for 5 years or over service with the company.

COMPARE THE NET AMOUNT WITH THE CASH CONTAINED IN YOUR ENVELOPE. COMPLAINTS MUST BE MADE BEFORE THE PAYING GUARDS LEAVE YOUR DEPARTMENT.

- IMPORTANT - RETAIN THIS STATEMENT (THIS IS A STATEMENT OF YOUR EARNINGS AND DEDUCTIONS INCLUDING TAXES REPORTED TO THE FEDERAL GOVERNMENT.)

McKesson & Robbins INCORPORATED
LABORATORIES BRIDGEPORT 9, CONN.

McKesson & Robbins INCORPORATED
LABORATORIES BRIDGEPORT 9, CONN.

EMPLOYEE'S SIGNATURE

FORM 2125-1

CLOCK NO.	EMPLOYEE	S. D. %	PERIOD ENDED	BASE RATE
1234	DOE JOHN	75	12752	1000

TOTAL HOURS	GROSS WAGES	WITH TAX	O. A. S. I.	GR. INS.	CREDIT UNION	WAR BONDS	M. L. A.	S. & K.	MISC.	NET WAGES
8000	11567	1070	174	108	1234	200	10		175	8596

COMPARE THE NET AMOUNT WITH THE CASH CONTAINED IN YOUR ENVELOPE. COMPLAINTS MUST BE MADE BEFORE THE PAYING GUARDS LEAVE YOUR DEPARTMENT.

- IMPORTANT - RETAIN THIS STATEMENT (THIS IS A STATEMENT OF YOUR EARNINGS AND DEDUCTIONS INCLUDING TAXES REPORTED TO THE FEDERAL GOVERNMENT.)

McKesson & Robbins INCORPORATED
LABORATORIES BRIDGEPORT 9, CONN.

McKesson & Robbins INCORPORATED
LABORATORIES BRIDGEPORT 9, CONN.

EMPLOYEE'S SIGNATURE

FORM 2125-1

CLOCK NO.	EMPLOYEE	S. D. %	PERIOD ENDED	BASE RATE
1234	DOE JOHN	75	12752	1000

TOTAL HOURS	GROSS WAGES	WITH TAX	O. A. S. I.	GR. INS.	CREDIT UNION	WAR BONDS	M. L. A.	S. & K.	MISC.	NET WAGES
8000	11567	1070	174	108	1234	200	10		175	8596

Night Time Double Time 9 220 "N"

Card contents are as follows:

Service Differential %	23-24
Type of Earning Code	25
Earning Rate	41-46
Base Rate	54-57
Type of Earning—Alphabetical Description	74
X's	75 & 80

Deductions Master Cards

Master Card deduction amounts are prepared according to each employee's particular status and consist of the following types:

Federal Credit Union: Code 1 (col. 58)—X's 73, 79 and 80. Deduction amounts maintained according to written advice from the Credit Union Office.

Group Insurance: Code 2 (col. 58)—X's 73, 78 and 80. Deduction amounts maintained according to written advice from the Payroll Department.

Deductions not made because of absence, etc., are reproduced and held for the following week's payroll, and "9" ganged into col. 22. A control ledger is maintained and reconciled to the Payroll Register.

Miscellaneous: Code 4

Smocks & Keys: Code 5

Union Dues: Code 8. Codes 4, 5 and 8 contain X's 73, 75 and 80. Deduction amounts are according to written advice from the Payroll Department.

McKesson Employees' Association: Code 6—X's 66, 73, 77 and 80. Deduction amounts are standard for each employee member (10 cents per week) and applied according to written advice from Payroll Department. Deductions are cancelled for pay-less employees. A control ledger is maintained and reconciled to the Payroll Register.

Bonds: Code 7—X's 73, 76 and 80. Deduction amounts maintained according to written advice from the Credit Union Office.

Deduction card contents are as follows:

Employee Name

1-19

Clock No.	50-53
*F.C.U. Pass Book No.	54-57
Deduction Code	58
Deduction Amount	70-73
X's (as listed above)	
*For F. C. U. and Bond deduction cards only.	

Earnings Detail Card Preparations

Earnings detail cards are prepared to account for each employee's total hours worked. If the total hours consist of more than one type of earning, a separate detail card is prepared for each type and the hours applicable to each type.

A regular earnings working set is prepared by reproducing and comparing the employee master cards, except as noted:

Name	1-19
Service Differential %	23-24
Social Security Number	26-34
Calculation Rate	41-46
X (ganged)	47
Department	48-49
Clock No.	50-53
Base Rate	54-57
*Hours "4000" (ganged)	59-62
*Salary Cols. 65, 66, 73, 74 into	63-66
Withholding Tax Class	78-79
*Office Salary cards only.	

If employee overtime volume warrants it, a second set is reproduced for an overtime earnings working set as follows:

Service Differential %	23-24
Type of Earnings Code "1"	(ganged) 25
X (ganged)	47
Department	48-49
Clock Number	50-53
Base Rate	54-57
Withholding Tax Class	78-79

The regular office earnings cards are held aside until later. The balance are kept in clock number sequence for key-punching hours, from the time cards. The overtime earnings set is merged behind the regular earnings set by clock number.

The "absentee" group time cards, as segregated by the Payroll Department, are used to match and remove reproduced earnings working cards and the "advice of changes" listing is used to match and remove terminations earnings working cards. Both absentee and termination cards are removed according to clock number and held aside until called for at a later use.

The "all other" group time cards are used to key-punch "hours worked" into columns 59-62 of the balance of the earnings, working cards. If overtime cards were reproduced, those not required are destroyed. Miscellaneous types of earnings cards are duplicated when indicated on the time cards (as stated in paragraph 2) substituting the correct type of earnings code in column 25.

Miscellaneous payroll adjustments, due to errors or employee transfers, originate from the Cost Department's labor analysis and are key-punched as miscellaneous earnings cards upon

written advice from the Payroll Department as follows:

Service Differential %	23-24
Type of Earnings Code "5"	25
X	47
Department	48-49
Clock Number	50-53
Amount	63-66
Type of Earnings, Description "A"	74

All earnings cards (including office regular earnings held aside in paragraph 3) are listed for totals checking with a minor control on type (25) and clock number (50-53) according to the file time card taped control groups.

The office regular earnings cards are held aside. The balance of earnings cards are sorted by type on column 25. The factory regular earnings cards (zero or blank on column 25) are set aside as are the miscellaneous adjustment earnings cards (5 in column 25). The balance are earnings cards without rates. These are sorted and merged behind the earnings rate master cards for base rate (54-57) within service differential (23-24) within type of earnings code (25) sequence. The collator is wired for selection of unequal secondaries to determine that each detail group is preceded by a master card.

The detail cards are interspersed ganged-punched and verified and checked for double punch and blank column detection as follows:

Type of Earnings Rate	41-46
Type of Earnings Rate Description	74

The master cards are removed on X-75 and returned to file.

The detail cards and the factory regular earnings cards held aside are multiplied for hours (59-62) times earnings rate (41-46) and the earnings amount punched into columns 63-66. The extensions are verified by check-multiplication using column 58 for check punch.

All earnings cards (including office regular and miscellaneous adjustments held aside) are tabulated for total gross wages and hours. The hours total is verified to the controls and the wages total is recorded for subsequent control.

Gross Wages Tax Calculations

The earnings cards are sorted by clock number (53-50) and tabulated with a minor control on clock number punching gross wages summary cards as follows:

Clock Number	50-53
Gross Wages	40, 63-66
X	70
Withholding Tax Class	78-79

The summary cards are tabulated for gross wages total and verified to the tabulation total.

The summary cards are further verified by matching on the collator with the employee master cards controlling on clock number (50-53) and withholding tax class (78-79) selecting unmatched summary cards.

The summary cards are sorted behind the withholding tax master cards on gross wages dollar amounts (64-63, 40). Cards of gross wages less than \$13.00 are removed and separated into two groups:

- a) Withholding tax class "00" in columns 78-79. Tax calculated manually as 15% of gross and punched into columns 35-38.
- b) All other. These are tax exempt and are held aside until called for in next operation.

Cards of gross wages more than \$98.00 are manually punched according to the prepared tax table amounts per withholding class into columns 35-38. (Tax-table book available in the department procedure folder.)

The gross wages cards of \$13.00 through \$98.00 and the tax masters are further sorted by withholding tax class (79-78) and the tax amount is gangpunched, verified, and double-punch, blank column detected into columns 35-38 of the summary cards. The tax master cards are removed on X-75 and returned to file.

All gross wages summaries are combined as one group again and separated upon written advice from the Payroll Department for the following:

- a) Employees with year-to-date earnings over \$3,600
- b) All other

Group (a) are F. I. C. A. tax exempt and therefore *wages less taxes* are calculated by deducting the withholding tax (35-38) from the gross wages (63-66) and punching the result into columns 70-73. (Board diagram contains wiring instructions.)

Group (b) *F. I. C. A. Tax* is calculated by multiplying digit omitted $1\frac{1}{2}\%$ times gross wages and punching the product into columns 67-69 and *wages less taxes* are calculated by deducting F. I. C. A. tax and the withholding tax from the gross wages and punching the result into columns 70-73, all in one operation.

Both groups are combined and the completed gross wages tax summary card set is tabulated for grand totals. The *gross wages total* is verified to the payroll control. The *F. I. C. A. total* equals $1\frac{1}{2}\%$ of the gross wages total. The *wages less taxes* total checks to the gross wages total less the F. I. C. A. total less the withholding tax total.

Payroll Register and Summary Cards

The deductions master cards are prepared for the payroll register by removing absentees and terminations according to the absentee time cards group and the "Advice of Changes" list by clock number. These are set aside.

All payroll cards are placed into sorter in the following sequence, and sorted by clock number (53-50):

- *1—Regular Earnings Detail Cards ("O" in column 25)
- 2—Gross Wages Tax Summary cards (X-70)
- 3—Deductions Master Cards (X-73 and 80)
- *4—Miscellaneous Earnings Detail Cards (1-9 in column 25)
- *If an employee's earnings consist wholly of types *other than* regular earnings, the other earnings cards are placed *first in sequence* and the related tax and deduction cards are key-punched with the other earnings type code in column 25.

EXAMPLE: A typical example is the earnings of a night watchman. His entire earnings are type 7 (night time rate) and therefore, his earnings card is placed first in sequence and his gross wages tax and deductions cards are also punched "7" in column 25.

The payroll cards are tabulated with a minor control on type of earnings (25) and intermediate control on clock No. (50-53) for the *Payroll Register*. Summary cards are punched on minor totals as follows:

Date Paid	(gang-punched) 2-7
Gross Wages	8-12
Hours Worked	13-16
*Period Ended	(gang-punched) 17-22
Service Differential %	23-24
Type of Earnings Code	25
X's	38-40
Bond Deduction	39-42
Smocks, keys & Union Dues	
	Deduction 43-46
Department	48-49
Clock Number	50-53
Rate	54-57
F. I. C. A. Tax	58-60
M. E. A. Deduction	61-62
F. C. U. Deduction	63-66
Group Insurance Deduction	67-69
Withholding Tax Deduction	72-75
Net Pay	76-80

*Office Cards (clock #1000 and up) gang-punched with current week ending date. Factory cards gang-punched with previous week ending date.

The detail cards are tabulated for control group and grand totals, and verified to the controls. The cards are held aside until called for in a later step. The summary cards are tabulated and verified like-wise (using the payroll envelope permanent board) and set aside.

Absentee—Termination Register: The absentee and termination cards and the related un-used deduction cards set aside are sorted together by clock number (53-50) but keeping the absentee's separate from the terminations. The cards are tabulated with a minor control on clock number, the absentee cards first, with totals and the terminations below on the same sheet, with totals. The cards are held aside for future step.

Payroll Envelopes

Payroll envelope employee identification heading cards are prepared by reproducing the employee master cards into any available electro as follows:

Name	1-19
Service Differential %	23-24
X	(gang-punched) 30
Period Ended	(gang-punched) 35-40
(Same as in paragraph for Office and factory)	
Clock No.	50-53
Base Rate (factory only)	54-57
Salary (Office only)	65, 66, 73, 74
	into 47, 54-56

Continued on Page 85

Faster Financial Statements

By Harry I. Condon, Comptroller
Lightolier, Incorporated,
Jersey City, New Jersey

HOW FAR can punched-card systems go? Lightolier Incorporated has pioneered some interesting developments in answer to this question.

A new development in the use of punched-card tabulating equipment has enabled the management of Lightolier Incorporated to create a general ledger and produce monthly operating statements with savings in both time and costs.

Lightolier, for 47 years a leading manufacturer of decorative residential lighting equipment, is an old hand at pioneering. Its history has been highlighted by a number of progressive manufacturing innovations, made by its own staff and by outside consultants. Like many comparable organizations, we were plagued for years with headaches involved in getting out operating statements and management reports each month. A total of 1,950 general accounts had to be represented on the operating statements, and reports of the manufacturing departments had to describe—on a standard cost basis together with the necessary variances—the work of 17 main groupings of products, a real estate operating department, ten operating service departments and the attendant schedules. The operating information in the distribution department requires a geographical breakdown.

Monthly Reports in Six Days

Under the conventional method, it was impossible to develop this information into report form before the 20th day of the following month, and even then the information was not complete enough to allow detailed analysis. Now we are able to produce complete operating statements with all their ramifications—and many additional advantages—on the sixth working day after the end of the month, which is about the acme.

We first installed Remington Rand tabulating machines some years ago to handle the work of invoicing, end-of-the-month accounts receivable statements, reports for computing salesmen's commissions and analysis of sales by product classification, territories and other breakdowns. Application of the same principle of pre-punched-cards—and facilitating fast punching where pre-punching was impractical—led us to the subsequent tabulating of accounts payable, in which the alphabetical tabulator wrote single checks for multiple bill payments by due date, made cost or expense distributions, and provided the accounts payable schedule. From this operation we readily obtained total purchases, listed by vendor or whatever other statistical breakdown was needed by management, and with the same guiding concept in mind, we then went on to tabulating inventories, cost of sales and—after a great deal of effort and planning—the factory and office pay-rolls.

Having arrived at this stage of tabulating achievement, we wanted to go a step further—a big step—and apply the tabulating principle to the amassing of all this subsidiary information into a general ledger, so created that a further simple tabulating operation would produce fully detailed valuable financial reports.

Our traditional general ledger was a mass of heterogeneous detail involving thousands of accounts in manufacturing and distributing ends of the business (actually two separate companies), and our monthly reports included overall financial statements, sub-statements and schedules for each company, each department, each commodity, and each area. It was a back-breaking chore which consumed too much of the time we could have devoted to analytical scrutiny of the figures. Our goal in this tabulating project was to cut the time spent on the operation to less than half, permitting accounting executives to give 80 per cent of their time to analysis, 20 per cent to ledger preparation.

Top management's approval of the idea was contingent on two provisions: we had to prove that the system would speed up general accounting procedure and hence the reporting of financial statements, and had to prove—this was the bug—that it could be done more economically than before, as had been the case with our other tabulating installations.

Problem Studied Thoroughly

We set to work on the problem, reconsidering every phase of our tabulating work in the light of its ability to produce final distribution cards. We also arranged to visit other companies which had completed or were in the process of developing overall accounting systems with tabulating equipment. These investigations were not too encouraging. Many companies had found that the job could be done only at a very expensive level, with many more machines and people than we were prepared to use. Our own internal and outside accountants were reluctant to depart from the general ledger system, unwieldy as it was.

Our accounting executives themselves, normally an aggressive lot, were intrigued with the project but uncertain of its practicality until the development was well under way. Then their enthusiasm mounted with each accomplishment, and within 90 days we had achieved our goal.

First we arranged the chart of accounts in order to make tabulating possible, standardizing such irregularities as the appearance of certain accounts in varying sequences in different parts

Continued on Page 109

Six Steps for Effective Supervision of an IBM Accounting Department

By Louis R. Mobley,
IBM Educational Staff

THE TITLE of this discussion, "Six Steps of Effective Supervision," may be misleading. It does not mean that any supervisor who will do these six things will necessarily be a good supervisor in a machine room installation. The title indicates, however, that there are six very important and essential things which a supervisor in a machine room must do, if he is to succeed at all in giving to management in his organization the results which they need for effective control of the organization. These ideas for effective management at the departmental level are not just dreamed up by one, or even a few individuals. They have grown out of many conferences and discussions with thousands of machine accounting department supervisors, who have come to the Endicott IBM School for customers and have participated in the classes which we have there in our Customer Administrative Division, dealing with the management of an IBM Machine Accounting Department. The few ideas which are being presented here have grown out of the experience with those supervisors. Much additional experience has been gained by visiting installations of machines all over the country, and in talking to and discussing the problems of many thousands of additional supervisors, who have adopted ways and means of making their installations more effective, and the methods and techniques which they have used in order to give management the feeling that they have a worthwhile productive installation.

Unfortunately many supervisors have to learn the management techniques the hard way. The basic principles of effective management are well-known but not widely practiced at the departmental level. This generally results from lack of management training provided for supervisory personnel. American business in the past has taken a great deal of trouble and gone to much expense to train operating personnel; that is, clerks, office boys, machine operators, etc. Supervisors and other management representatives in organizations have had to learn themselves, to a great extent, the principles involved in good management. The most effective organizations, however, realize that management representatives, especially supervisors, must be taught the basic principles of sound administration and good management if they too are to accomplish their jobs correctly. Many schools and colleges, are, for the first time, making available courses for management representatives, so that they might become acquainted

with the newest techniques that are available at the present time. Experience in management that was gained even ten years ago is no longer sufficient to cope with the problems of today. The very definite changes which have taken place, from authoritarian management to democratic management, has made necessary a complete revision of our thinking. It is true that management is going back to school.

The following remarks will attempt to apply some of these principles to the management of a machine accounting department. An attempt will be made to emphasize the major aspects of coordinating machines, operators, and jobs so as to produce the maximum value of result at a minimum cost and with the smoothest possible personnel relationship.

Emphasis will be placed on the work that *people* do in the machine accounting department. Too much emphasis has been placed in the past by management upon the work that machines do. Machines are no better than the people who use them. They require intelligent direction and control if they are to produce worthwhile results. It is this direction and control which needs emphasis. Machine accounting departments do not usually fail because of the machines that are involved, but in the vast majority of cases where machine accounting installations have not proven worthwhile, it is nearly always due to the supervisor or operators who use the machines. They have neither been told what their function really was, or were not trained properly in the techniques involved in the effective use of mechanical equipment. When a person is made more productive by placing in his hands powerful tools, that person assumes, whether he likes it or not, vastly greater responsibilities; therefore, he must be trained to assume properly these responsibilities of his job.

The supervisor of the machine accounting department has at his disposal a vast productive capacity which he may use well or poorly. Successful supervisors have fulfilled in one way or another the majority of the six steps which I wish to discuss. On the other hand, it has been observed that the poorer supervisors have failed to comply with the six requirements which we might set forth as the "Six Steps of Effective Supervision."

Let us see what these six steps of effective supervision of a machine room installation are:

Step 1—Clearly Specify the Work to Be Done in the Department

I have asked many supervisors the question: "What is your responsibility as supervisor in this machine room department?" Frequently the answers will be something like this: "My main job is to keep machines repaired and running as much time as possible." Another will reply that his main job was to settle disputes between operators. Still another may reply: "Our job is to meet deadlines." Occasionally we hear the answer: "I sometimes wonder what my job really is."

The successful performance of any job requires a complete understanding of the objectives of the job and the procedures to be followed in meeting these objectives. The starting point of a good supervisory job starts with management (I use the term management to apply to those individuals in an organization whose responsibility and interest is usually above the departmental level). It is a responsibility of management to place the supervisor in a position where he *can* do a good job. The supervisor together with management representatives, working as a team, must determine which reports are necessary and should be produced; they must determine when these reports should be presented; they should establish priorities of the various reports and the availability of source documents. It is necessary that the flow of work between the IBM department and the other departments be scheduled and coordinated.

If the system of departmental coordination has not been worked out by management, then it becomes the supervisor's job to do it himself. He actually assumes the role of management as he works with other supervisors in establishing schedules of reports, and "Due-In" times of source documents. In some cases, we find supervisors trying to *sell* their management upon certain desirable changes which should be made in the schedules of reports. Some will say that this liaison activity with other supervisors and with management on his own initiative is part of the supervisor's job. I prefer to think that these functions require cooperative job between the machine room supervisor, other department supervisors, and management. They are part of the responsibility of management.

In determining these objectives of the machine room, it is desirable to make a list of all regular reports that are to be produced. This list is sometimes referred to as a Schedule of Reports. It contains not only a list of the reports but also when they are due—the so-called "Due-Out" time. It may contain also priorities of the various reports, where they should be delivered, and the number of copies, etc. It is highly desirable to have not only a list of these reports, but an actual *sample* or exhibit of the reports that are to be produced on a regular basis. These exhibits serve to specify in precise detail the exact objectives of the department.

Once having established the objectives, the supervisor is then in a position to work with his operators and determine the jobs and operations

which must be performed to arrive at the desired objectives. He must identify each regular job, specify each and every operation within each job, and record all operational details of the work to be done. Such detailed specifications as these, of course, make up the manuals of procedure.

Many supervisors at this point prefer to draw an operational flow chart of the various jobs for which they are responsible. This flow chart attempts to show symbolically every function or job step operation necessary to be done for each regular job or procedure. Regardless of the technique involved, it is highly important that the supervisor establish on paper a clear representation of every operation involved for all his regular jobs. The term operation applies to a function where a *machine*, and an *operator*, and a set of *cards* which represent a given job, are brought together at a particular time. An operation is a function.

Flow charts (or other representations of the procedures to be run in the machine room) are highly beneficial to the supervisor in his communicative activity. An essential quality desired in all supervisors is the ability to communicate effectively with other people. This is particularly important at the departmental level because the supervisor must communicate, not only upward to management representatives, but also downward to operators and clerks. He must also communicate laterally with other supervisors in other departments in performing certain liaison work. It is axiomatic that efficient operation depends upon efficient communication. Most operational difficulties can be traced to break-downs in communication. Someone failed to get the word, or some heard but they didn't understand, or someone thought that something else was said. These are all common alibis that we hear every day which grow out of breakdowns in communication. Procedure flow charts and Manuals of Procedure are of tremendous value to the supervisor as a medium of communication to his management, to other supervisors, and to operators.

Having established the objectives of the job and the procedures necessary for carrying out these objectives, the supervisor is then in a position to develop the operators' manual of procedure. This means that for each operation or job step involved in the various procedures, detailed technical information must be provided. This information is of greatest value to the individuals who will operate the machine and actually carry out the functions entailed in the various operations. It is in the operators' manual only that we find reference made to certain technical and machine terms such as X43, column 80, commutator, type bar, switches, control panel, and other operating details. In order that these worded descriptions might have greater possible meaning to the operators, it is desirable again to include sample forms, sample documents and

Continued on Page 188



Budgetary Control

at University of Miami

by Floyd Howell, Jr.

DURING THE PAST FEW YEARS with rising costs, personnel problems, government requirements and regulations, and the like, it has become quite evident that machine methods of preparation of reports are as important and necessary to educational institutions as to private business or government agencies. These problems, further complicated by the diversity of the University's activities, make it necessary that management be provided with accurate reports almost immediately in order to be of any value.

Here at the University of Miami, with its 236 departments, we are meeting these demands through the use of the punch card method of accounting. At present we are using IBM accounting machines to do Student Registration, Departmental Budget, Accounts Payable, Payroll, Library Acquisitions, Library Circulation, Admission Statistics, Placement Test Reports, and numerous other statistical reports and surveys. Since one of the most important problems facing business firms today is that of controlling expenditures in the face of rising costs, perhaps it would be most appropriate to discuss our Departmental Budget procedure.

First, a brief background of our Budget Control system and the Forms used therein

Basic Structure

Our budget year begins on June first. Prior to this date each department head receives a Budget Request form on which he computes his estimated needs for the coming year. These needs are broken down into three main categories: (A) Salaries, (B) Supplies and Expenses, and (C) Capital Outlay. These are further broken down into sub-classifications such as: A 01 Executive Salaries, A 02 Faculty Salaries, A 03 Clerical Salaries, B20 - B27 Supplies, B30 - B51 Expenses and C90 - C98 Equipment.

These Budget Request forms when completed are forwarded to the Budget Officer who checks them and forwards them to the President for approval. After their approval, an IBM Allotment Card is punched for each department, for

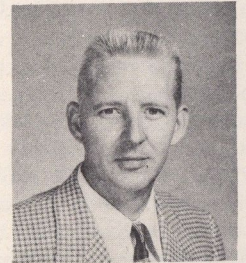
each main category. These are filed in the Allotment File to be used in the preparation of the monthly report.

Source Documents

There are six source documents from which the daily budget cards are punched. They are:

- BJ - Budget journal entries
- DE - Direct expenditure vouchers
- PO - Purchase Orders
- CN - Change Notices to record increase or decrease in PO.
- PS - Partial Shipments
- WO - Work Orders, Requests for property managers' services.

... About
the
Author:



After graduating from Tulane University in 1942, with a B.B.A. degree, our author, Floyd Howell Jr., entered the U.S. Navy as an officer. After four years of service, he joined I. B. M. and completed their sales training course at Endicott, New York. During his tenure at I. B. M., he qualified for three, one hundred per cent clubs. Since his resignation from I. B. M., he has been Manager of the Machine Records Department at the University of Miami. Without question, his background in the machine accounting has qualified him well for his present position.

... About the University:

The University of Miami's eight colleges and schools provide training in the arts and sciences, education, business administration, law, engineering, music, and advanced studies.

The University of Miami was chartered in 1925 by the State of Florida as a non-

the Punched Card

IBM 792230

16. The Direct Expenditure Cards are sorted by the Sub-Classification Code and a tabulated recapitulation prepared showing the total expenditures by Sub-Classification for the current month.

19. The Open Purchase Orders are then sorted by Reference Number and a list of Open Purchase Orders prepared.

Exhibit A

Exhibit B

UNIVERSITY OF MIAMI

- ☒ TABULATION OF PAYMENTS BY VENDOR
☐ ACCOUNTS PAYABLE TRIAL BALANCE
☐ CHECK REGISTER

DATE		VENDOR OR PAYEE	VENDOR NUMBER	REFERENCE NUMBER	AMOUNT		CHECK NUMBER
MO.	DAY						
12	14	ASSOCIATED LAB	0535	PO24987	104	*	
12	07	DANCE MART	1705	PO24487	1300	*	
1	04	FLA ELEC	2380	PO24737	6730	*	
12	26	KELLS PRESS	3497	PO24356	600	*	
12	31	MIAMI HERALD	4164	PO25007	4250	*	
1	02	SOUTHRN LETTER SER	5683	PO22109	856	*	
					13840		

Exhibit C

UNIVERSITY OF MIAMI

- ☐ TABULATION OF PAYMENTS BY VENDOR
☒ ACCOUNTS PAYABLE TRIAL BALANCE
☐ CHECK REGISTER

DATE		VENDOR OR PAYEE	VENDOR NUMBER	REFERENCE NUMBER	AMOUNT		CHECK NUMBER
MO.	DAY						
		A S ALOE	0190	PO24577	3150		
		A S ALOE CO	0190	PO24577	100		
					3250	*	
		AMEDIC SURGICAL	0210	PO24706	1980		
		AMEDIC SURGICAL	0210	PO25017	390		
					2370	*	
		CORAL GABLES PAINT	1550	PO24244	3095		
		C G PAINT CO	1550	PO24708	2980		
		C G PAINT CO	1550	PO25199	36145		
					42220	*	
					47840		

Exhibit D

BUDGET OFFICE

DEPARTMENTAL BUDGET — UNIVERSITY OF MIAMI

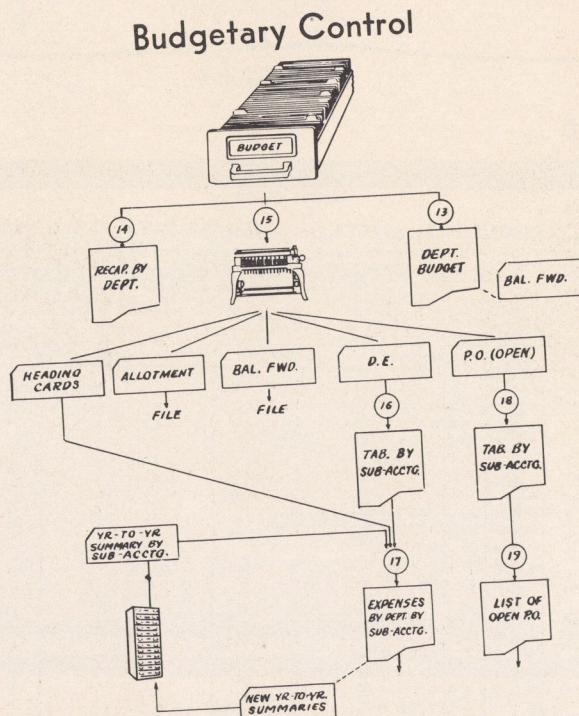
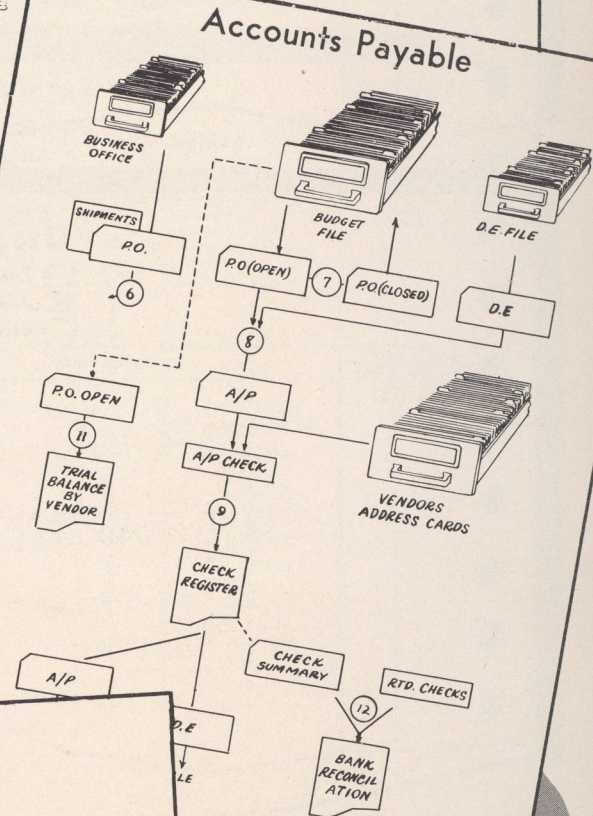
THIS STATEMENT SHOULD BE CHECKED BY DEPARTMENT HEADS IMMEDIATELY, UNLESS ERRORS ARE REPORTED TO BUDGET OFFICER BY THE 15TH OF THE MONTH FOLLOWING THE DATE OF THIS STATEMENT, THIS STATEMENT WILL BE CONSIDERED CORRECT.

748

ANY DEPARTMENT		123	63051		DATE		* OVER DRAWN CR FREE BALANCE
DEPARTMENT		DEPT. NO.	MO.	DAY	YR.	DATE	
DESCRIPTION	SUB-ACCT.	REFERENCE	ALLOTMENT	OPEN	ORDERS	EXPENDITURES	FREE BALANCE
ALLOTMENT	A		3605010				
SALARY ADJ	A	BJ00007	37600				
EXEC PAYROLL	A01	DE00118				42500	
NON EXEC PAYROLL	A03	DE00119				15000	
			3642610			57500*	3585110 CR
ALLOTMENT	B		827400				
JUNE MATERIAL REQUIS	B49	BJ00006				945	
TRUCKING JUNE 27	B49	BJ00008				560	
JUNE MIMEOGRAPH	B32	BJ00009				2539	
JUNE WORK ORDERS	B49	BJ00013				262	
JUNE POSTAGE	B32	BJ00014				30	
TRUCKING SERVICES	B49	BJ00015				560	
SEABOARD RR	B32	DE00036				2937	
RAILWAY EXPRESS	B32	DE00081				134	
RAILWAY EXPRESS	B32	DE00135				1077	
PETTYCASH VOUCHER 04	B21	DE00270				411	
PETTYCASH VOUCHER 04	B50	DE00270				300	
FISHER SCIENTIFIC	B21	PQ19863				975	
FISHER SCI CN3941	B21	PQ19863				190	CR
SOUTHERN SCIENTIFIC	B21	PO19951			12852		
SCI PS1664	B21	PO19951				6048	
GAS	B47	PO20185				660	

Exhibit E

6 30 51

Exhibit F

We Offer A Complete Printing Service

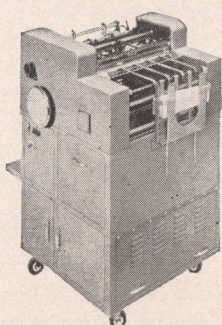
CONTINUOUS MARGINAL PUNCHED FORMS

Tabulating • Strip • Teletype

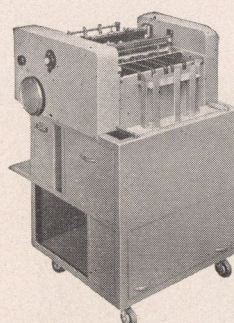
FANFOLD • EASYSNAP • FLAT FORMS

BOOKS • CATALOGS • MANUALS • PAMPHLETS • DIRECTORIES

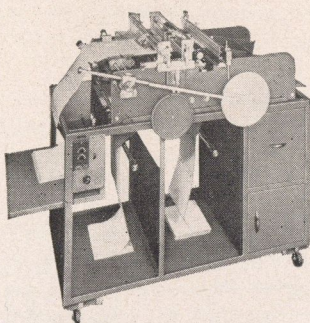
[The Custom Designed Machines shown below are Available
for Sale to Customers using Wallace Press Tabulating Forms]



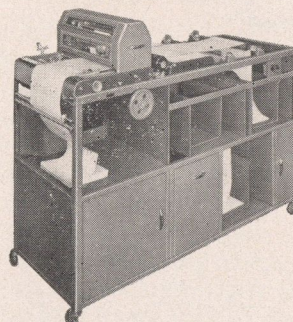
All size forms cutting, trimming, and imprinting machine. Variable speed drive.



Continuous forms payroll machine for signing, numbering, dating, trimming and cutting checks at high speed.



Combination imprinting, cutting, trimming and decollating machine. Carbon rewound on spindles.



Combination imprinting, trimming and decollating machine. Carbon rewound on spindles.

Incorporated 1908

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Punched Card

Machine Room Layout

Burnell H. Miller Vice President
State Farm Life Insurance Co.
Bloomington, Illinois

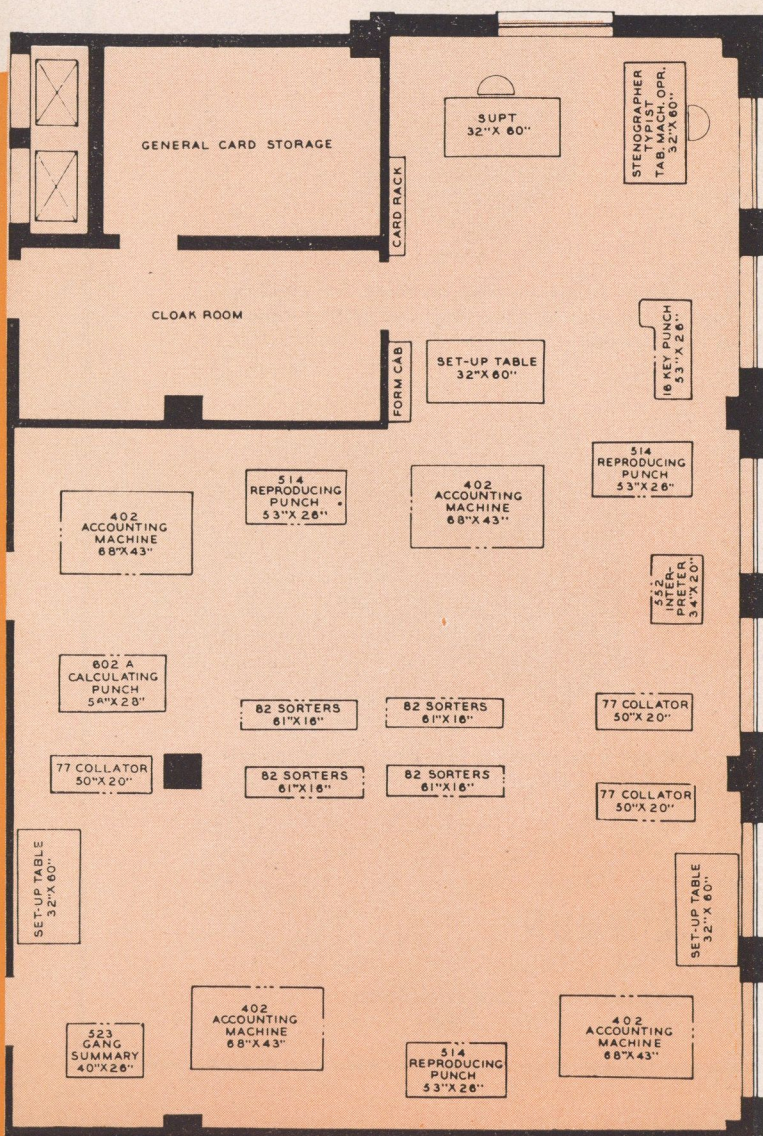
THE ACCOMPANYING DIAGRAM to this article illustrates the physical layout of a Tabulating Service Department.

As the name implies, this Tabulating Service Department is strictly a service unit, responsible for all punch card machine work for 12 other administrative and staff departments. It maintains no card files of its own. Instead, the creating and maintenance of punch card records are responsibilities of the departments concerned. The Tabulating Machine room does include facilities for general card storage and maintains the perpetual inventory of card stock. In addition, card racks have been provided for summary cards required in the various jobs.

Estimated expenses of the Tabulating Service Department are statistically absorbed by the budgets of the departments for which service is performed. The estimates of the expenses to be absorbed are based upon the budget prepared by the Superintendent of Tabulating Service and the estimates of the administrative departments of the service they will purchase from Tabulating Service. Actual expenses are distributed to customers each month, based upon the utilization of each machine and of the total salary expense of the department.

Personnel of the Tabulating Service Department is generally trained in the operation of all equipment rather than as specialists in the operation of a single type of machine. This method of training permits work assignments by job rather than by machine. Responsibility for a completed job is placed on a group leader with the title of Chief Tabulating Machine Operator. This background has been supplied to explain the layout of the Tabulating Service Department.

The grouping of machines into "work centers" is natural under this plan of assigning work by complete job. As shown by the layout, each work center customarily includes a sorter, a model 402 tabulator, a reproducing summary punch, a collator, a set-up desk or table and sufficient storage space to accommodate work in process. A 602A calculating punch and an interpreter generally supplement the equipment of all centers.



Four Basic Principles of Work Simplification

. . . About the Author:

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By Ben S. Graham

The pioneers combined fundamentals of motion study and a philosophy—to eliminate waste

PAPERWORK has been in the spotlight since the early days of World War II. Following the war and a return to competitive markets, the emphasis on cost has led to many varied attempts to reduce Paperwork and office non-productive costs. Too often the emphasis has been on the non-productive costs rather than on the elimination of waste. This misplaced emphasis can frequently lead to apparent cost reductions which result in expensive wastes in other areas.

Measurements of Paperwork in terms of the objective—"does it help someone do his job better?"—can help in the elimination of much of the major "office" waste. It is also important to measure the values derived from the product of the Paperwork, against the cost of that product. When this is done, systems important to the control of production, product quality, or cost will not be the unfortunate victims of an economy drive.

Elimination of waste is our objective in Paperwork Simplification. This includes the waste due to entire procedures that do not measure up, the waste found in duplication of systems, poorly designed systems, inaccurate and low production in the various phases of a system. More important, it includes the waste which occurs in the productive functions of a business due to inaccurate or inadequate Paperwork. Most important of all, Paperwork Simplification and Work Simplification take into account the waste of personal interest, initiative and enthusiasm—it never overlooks the importance of acceptance of the improved method by the people who will use it.

Work Simplification Defined

Paperwork Simplification is the adaptation of Work Simplification to the problems of Paperwork. Work Simplification is defined in simple terms as, "The organized application of common

sense to find better and easier ways of doing a job" or as I prefer, "The organized application of common sense to eliminate waste of any kind—waste time, energy, space, material, equipment, etc." *Eliminate waste* implies getting results, not just talking about it. Results come from better methods only when they are enthusiastically used by the people concerned. For years, the "enthusiastic use by the people concerned" was the reef on which many "better methods" foundered.

About 15 years ago several of the leaders in the field of scientific management, Allan Mogensen, Professor Erwin H. Schell of Massachusetts Institute of Technology, Dr. Lillian Gilbreth and Professor David B. Porter of New York University, recognizing the importance of enthusiastic cooperation, combined the simple fundamentals of the technique of motion study with a way of thinking or philosophy of management and called it Work Simplification. Having repeatedly developed and installed better methods only to return a few months later and find that people on the job had reverted to their old methods, these pioneers recognized the problem involved in developing *acceptance* of the better methods. The problem involved the most difficult and highest type of selling, the selling of an idea or an intangible. People buy what they want rather than what is good for them or what they need.

The first and most important problem is to convince the individual worker that he has a direct personal stake in eliminating every possible element of waste. Then get the individual "into the act" in the elimination of waste and he will "Buy" his own ideas for improvement enthusiastically and make them work. Too often the expert mistakenly calls his activity "Work Simplification." In many cases anticipated results are not achieved because of the seeming lack of appreciation of the importance of enthusiastic cooperation on the part of every individual.

Productive Activity

The principles of Work Simplification emphasize the importance of the individual, recognize the need for enthusiastic cooperation and provide simple, usable measurement of the effectiveness of methods.

The first principle is: *Activities should be Productive*. By "activity" we mean anything that goes on in business, including delays and storages, as well as the various operations and moves in a procedure. Since Paperwork is entirely a non-productive function in business, it is necessary to stretch the meaning of the word "productive" when we apply these principles to Paperwork. However, the end results of Paperwork are essential to the best conduct of the business. If we define productivity as directly accomplishing the end results, we can apply the term to Paperwork.

The typing of a 3-part letter, an original and two copies, will illustrate the point. Assembling

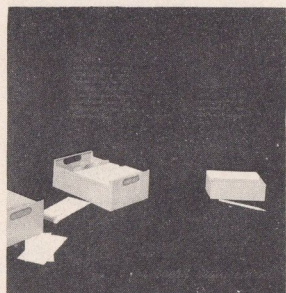
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Tabulating Department Accessory Equipment

A vital part of the efficient operation of any tabulating department is the use of accessory equipment. This equipment ranges from card files, key punch desk units, mobile units to transfer cards, forms bursters, to the ultimate, of binding report forms processed in the tabulating department as part of the permanent records of the organization.

The manufacturers of tabulating accessory equipment are keeping abreast with the tremendous strides being made in the development of new machine accounting equipment.

In order to be of informative service to the machine accountant and tabulating supervisor, "The Punched Card" is pleased to include a pictorial presentation of some of the tabulating accessory equipment manufactured. This presentation is meant to be unbiased and no endorsement is intended of any of the articles pictured. This section is intended solely to be educational, informative, and an aid to machine accountants in enlightening them as to the utilization of certain types of accessory equipment.

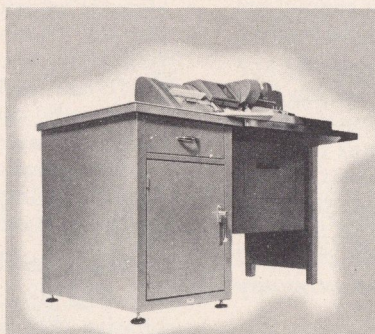


Key Punch Desk File: Designed to match the new IBM punches and its appearance will complement any department.

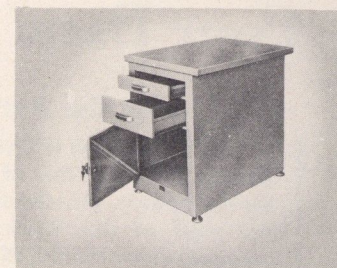
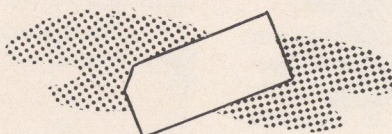
Its spacious and convenient drawers for storage of all operating supplies, aids in creating a more efficient and neat operation.

The pull shelf provides extra space for documents. The plastic laminate top complements the new key punch top. The utility drawer is equipped with convenience tray. The card drawer has two large compartmented sections. The storage drawer can be used for either work in process or storage of cards. The personal effects drawer is provided with a lock. File has adjustable glide feet.

Manufactured by Wright and Company, Inc., Worcester, Massachusetts.



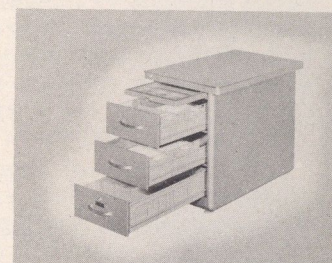
Tab Steel Card Punch Desk: A much-needed personal desk for every employee. Large lower compartment gives flexible storage for almost anything the operator wants to put away. Desks allow closer supervision. They help achieve a neat department. Comes with drawer and has door with lock in handle. Operators appreciate theft-proof storage. Adjustable feet give 26-inch to 27½-inch height to match height of either old or new style card punches. Grey linoleum tops are standard. Manufactured by Tab Products Company, San Francisco, Cal.



Key Punch Desk File: Monarch Metal Products, Inc., of Mount Vernon, New York, manufactures this new, inexpensive, full-size, all-steel Key Punch Desk File. Equipped with two drawers and compartment, it has a sturdy gray linoleum top with a flush steel binding.

Two drawers provide ample space for card stock, skip bars, paper clips, pencils and other necessary working accessories. Up to three Monarch trays can be placed inside the second (and lower) drawer in a position facing the key punch operator. The compartment has a Yale & Towne locking handle to provide a secure place for the operator's personal belongings. The adjustable feet allow a 2½-inch adjustment, so height can be matched to the card punch machine.

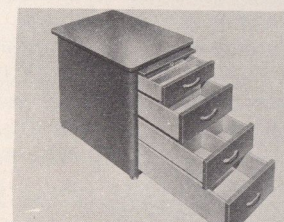
This item is finished in a pleasing gray wrinkle baked enamel.



Key Punch Desk: Has a removable convenience tray and three drawers (two removable card trays with compressors). The lock on the bottom drawer assures the operator of a secure place in which to store personal belongings.

The drawers furnish ample space for cards, skip bars, pencils, paper clips and other accessories necessary in the operator's work.

This item is manufactured by Systems Sales Company, New York City.



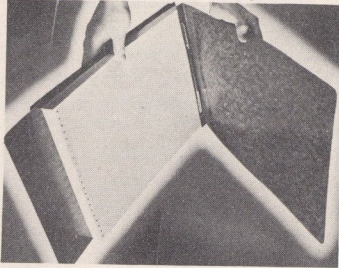
Key Punch Desk: Provides a two-fold function in the tabulating department—

ample space for work in process, and for the operator's personal belongings. Provides over 4 cubic feet of drawer space in a compact, attractive unit of all-steel construction.

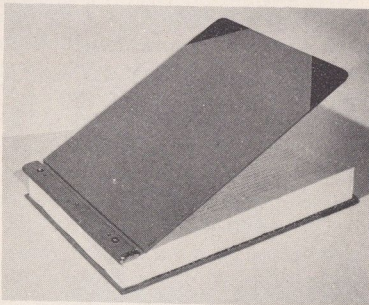
The satin smooth desk top is of serviceable linoleum and can be set at key punch height by adjustment of desk feet. Adjusting range is a full 2 inches.

The dimensions are: height, 26½ inches; adjustable to 28½ inches; width, 19 inches; depth, 26 inches. Weight approximately 90 pounds. Finished in Slatestone grey baked enamel.

Manufactured by Duro Consolidated, Inc., Redwood City, California.



Tab Economy Storage Binder: For economical, flat binding of all of your tabulated reports. With tough attractive press board covers. Fasteners fit marginal punched holes of continuous form paper. Manufactured by Tab Products Company, San Francisco, California.



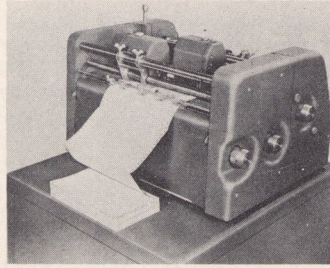
Kant-Slip Binders: Binds detached copies of continuous forms for ready reference. Made of heavy binder-board, canvas covered, with black imitation leather corners.

Equipped with 2-, 3-, 4- or 5½-inch pin posts depending on length of form. Marginally punched holes are used for filing purposes.

Posts are available in 2-, 4- and 6-inch heights. Posts threaded at one end to fit into bottom section of binder. Small wrench provided with binders to remove and tighten posts.

Slight pressure on button type locks releases cover which is lifted easily from the posts. Cover automatically locks when replaced.

Manufactured by Standard Register Company, Dayton, Ohio.

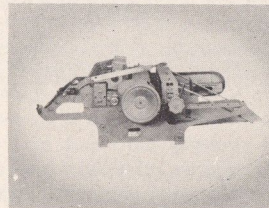


Universal Burster Imprinter: Manufactured by The Standard Register Company of Dayton, Ohio, imprints and detaches individual forms from a continuous strip at the rate of 12,500 3½-inch forms per hour and other length forms in proportionate times. It incorporates the same bursting unit as Universal Burster and the same features of that machine.

It can imprint, date, and sign. It employs a hammer type stroke and a 12-foot cloth, automatic reversible ribbon when imprinting. It can print from individual brass type, brass slugs, electros, and plates which have been embossed on a graphotype machine. Graphotype plates must be prepared in fixtures which are made to order to accommodate the size of plate.

Two printing units (one unit has type chase, other has electro) which are interchangeable, are standard equipment. Additional units—up to maximum of 6—can be applied; all can be used simultaneously or any can be made inoperative.

Maximum printing area of each printing unit—3-3/16 inches (for type) or 3½ inches (for electro) wide by 1 inch deep. Type is spaced 6 lines to the inch.



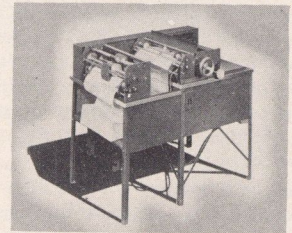
The Model 411 Imprinter-Detacher: Is mounted on a stand that may be moved easily on rubber casters. Designed to imprint at a specific form depth, it can be used as a tractor-feed multiple detacher on continuous, marginal punched, interleaved forms up to 4 parts—or up to six parts on fanfold forms.

As a "single" detacher, it will detach any depth of forms from 3 to 17 inches. This operation requires only that the imprinting plate, gear and cam be removed and the tractor slipped to one side.

The Imprinter-Detacher speed is fixed at approximately 60 feet per minute. To determine production rate, divide depth of form into 60 feet. This will give number of sets detached per minute.

Other features are: Imprinting may be started on the first form in a strip; one or both sides may be trimmed as desired; rubber plates are employed for imprinting to insure long life; printing ink is used for permanence and quality of imprint; height at paper level approximately 4 feet; floor space required is 3 by 5 feet; shipping weight, complete with stand, approximately 500 pounds.

Manufactured by Moore Business Forms, Inc., Niagara Falls, New York.



Forms Burster and Imprinter: This variable length burster with imprinting unit will imprint, trim off control punched margins and burst continuous forms—all in one operation. It can be used for bursting alone or trimming and bursting. Forms to be imprinted must be control punched. Forms to be burst may be punched or unpunched.

Imprinting unit may be used for signatures, slogans, branch addresses or department designations. Imprinting plate quickly affixed or removed. Signature plates can be instantly removed at any time for protective storage.

Dating can be accomplished by use of one or more dating wheels mounted on imprinting cylinder shaft. Daters adjustable to any position on form or easily moved to inoperative positions. Dater can be set for any day for ten years.

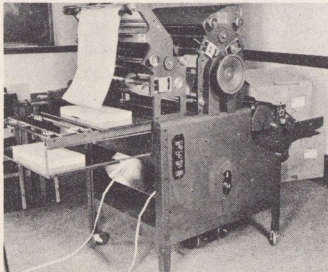
Trimming is performed by shearing wheels which give clean-cut edges on either marginally perforated or unperforated forms. Either wheel may be disengaged if one margin is to remain. Both wheels may be disengaged when trimming is not desired.

Bursting unit easily adjusted for any length form from 3 to 11 inches and for any width up to 18¾ inches. Forms burst exactly on horizontal perforations and are neatly stacked in sequence. No wrinkles or tears. No adjustments necessary for normal variations in grades or weights of paper.

All adjustments easily made without special tools or changing of parts or gears. Full safety features. Simple lubrication.

The length is 44¼ inches; width, 30 inches; height, 39 inches; weight, 340 pounds. Running speed of 18,720 per hour for 3½ inch forms; 5,900 per hour for 11 inch forms. The color is gray with a wrinkle finish.

Manufactured by UARCO, Inc., Chicago, Illinois.



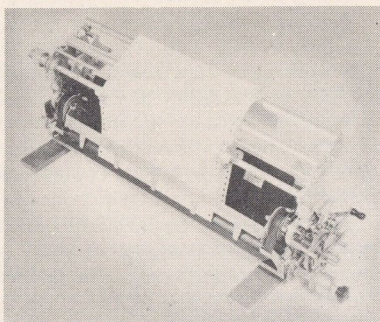
Model 412 Imprinter-Detacher: A heavy duty machine built for a multiplicity of fast forms-handling operations. In one high speed run through this precision machine, forms are imprinted (front and back), detached, trimmed (one or both margins) and stacked in numerical sequence.

Designed to operate electrically from a normal lighting circuit, without special wiring, it can be used as a combination machine for imprinting and detaching on one or several form depths.

It is adjustable to any form width from 5 inches up to and including 15 inches. The lineal speed of forms through the machine is variable. Recommended speed for normal runs is 60 feet per minute . . . 12,000 (3½ inch depth) forms per hour, or 4,000 (10½ inch depth) forms per hour. Ideally suited for utility billing applications where large daily runs are a requirement.

Other features are: Imprinting may be made from rubber or metal plates (rubber plates recommended for long life); dating may be accomplished by mechanical "daters" and consecutive numbering may also be accomplished if desired; printing ink recommended for permanence and quality of imprint; height is approximately 5½ feet; floor space required is approximately 3½ by 8 feet; shipping weight 1000 pounds.

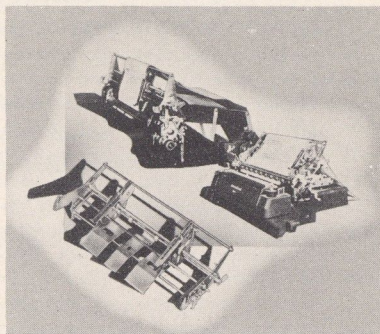
Manufactured by Moore Business Forms, Inc., Niagara Falls, New York.



Off-The-Platen Device for Remington Rand Model 3: This machine, as manufactured by The Standard Register Company of Dayton, Ohio, is designed specifically for Remington Rand punched card accounting machine Model 3.

It controls form off and above the platen both as they feed into and out of the machine. This dual control provides accurate alignment and registration. It can be quickly and easily installed or removed from machine by the operator without use of tools. Can be adjusted horizontally by vernier to compensate for expansion and contraction of paper.

Infold and outfold can be controlled by simple adjustment to insure satisfactory feed regardless of number of parts and weights of paper.

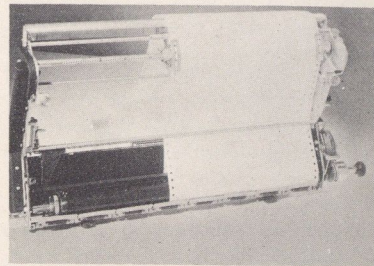
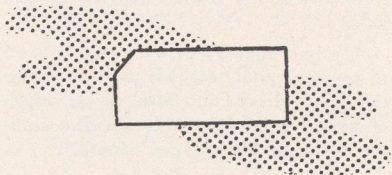


Tabuliner: Is a precision device for feeding and controlling control-punched forms in a tabulating machine. Control is effected through aligners on both sides of forms, each with a chain of pins which accurately engage in control holes in forms and carbons. At least seven pins in each aligner, always fully engaged in control holes, assure exact alignment and control—without creep or side slip.

Tabulating machine mechanism operates aligners so that aligners and tabulating carriage are always synchronized. Paper guides automatically follow aligners which are easily adjusted to any width form. Tabuliner is lightweight, but substantially built and runs freely with no drag on tabulating mechanism. Tabuliner comes in models for IBM and Remington Rand tabulating machines.

Tabuliner can be quickly removed. No tools necessary. It can be equipped with slit wheels for removing of perforated control punched margins up to four plies. Variable six or eight line to the inch spacing can be provided.

For IBM equipment, the length is 21¾ inches, depth 9¼ inches, height 6 inches, weight 7 pounds. For Remington Rand equipment, the length is 26¾ inches, depth 4¼ inches, height 7 inches and weight 10 pounds. Manufactured by UARCO, Inc., Chicago, Illinois.



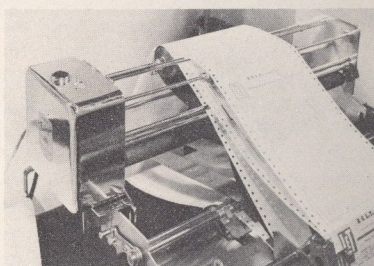
Off-The-Platen Device for Remington Rand Model 2: This machine, manufactured by The Standard Register Company of Dayton, Ohio, is designed specifically for Remington Rand punched card accounting machine, Model 2.

It controls form off and above the platen both as they feed into and out of the machine. This dual control provides accurate alignment and registration.

It can be quickly and easily installed or removed from machine by the operator without use of tools. Can be adjusted horizontally by vernier to compensate for expansion and contraction of paper.

Infold and outfold can be controlled by simple adjustment to insure satisfactory feed regardless of number of parts and weights of paper.

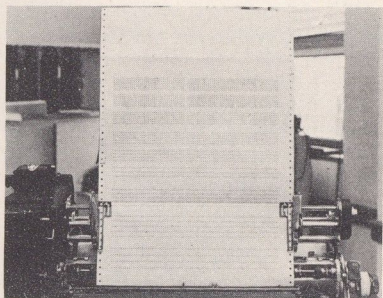
It accommodates any standard width form up to 10¼ inches. Depressing a latch permits pinwheels to be set automatically and quickly to accommodate varying widths. Both pinwheels have a lateral vernier adjustment. Can operate either with or without the regular Registrar Platen installation, but forms should not be made to feed over both sets of pins. It operates with either standard or automatic carriages.



Carbon Feedmaster: This new machine, manufactured by The Carbon Feedmaster Company of Eureka, Illinois, controls the feeding, spacing, and rewinding of carbon by spacing once for each line printed, regardless of single, double or triple spaced forms; heading or footing; or depth of body.

Designed to fit any IBM tabulator carriage, the Model 101 Feedmaster spaces, feeds and rewinds. It is the most revolutionary machine yet developed for reducing ditto master writing costs. Easily installed, the Feedmaster mounts on any tabulator carriage—simply lifts off and on. No screws or bolts are necessary. On master writing, or with 2-part forms this amazing machine can save up to 80% on carbon costs by eliminating carbon waste. Carbon feeds to carriage one line space for each line printed—there is no unused carbon space. Rolls of varying width provide unlimited flexibility—data can be blocked out left or right by setting rolls in desired position.

The Feedmaster eliminates carbon ribbons; with its automatic re-wind, there is no need to touch carbon; no flying carbon dust; cleaner copies (carbon contact at platen only); can be used for two-part forms; re-use carbon; unlimited flexibility.



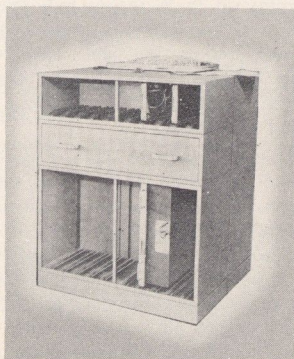
Formaliner: A special feature of the Formaliner is that spacing can be varied to perform any tabulating operation. A simple adjustment permits continuous forms to be fed at 8 or 6 single-spaced lines per inch. An 8:6 ratio also applies to double and triple spacing.

It only takes seconds to attach the flexible Formaliner to the accounting machine. It can be removed as quickly. No special stand is necessary to protect the Formaliner when not in use.

Single tractor advantages can be retained in the double tractor Formaliner. Forms with varied-width copies can be engaged on one tractor. The other is merely moved to one side. Form widths are not limited to standard sizes. Any form between 3½ and 19 inches wide can be aligned and controlled by the flexible Formaliner.

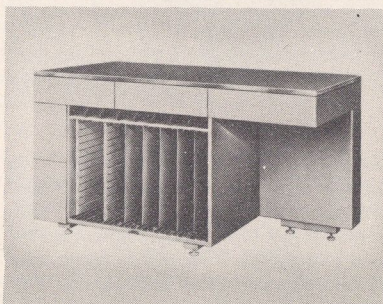
Change from a normal to a vertical position can be handled quickly. The flexible Formaliner need not be removed from the machine to make the change. The vertical position is necessary for use with transverse carbon ribbon devices. The vertical position performs best when continuous envelopes or forms printed on heavy stock are used.

Manufactured by Moore Business Forms, Inc., Niagara Falls, New York.



Control Panel and Wire Storage Sections: Designed with the everchanging machine accounting department in mind. It provides complete flexibility of arrangement to fit the many different department requirements. Any number of combinations are possible. The flexibility of these storage sections makes it possible to arrange a more efficient cabinet for individual needs. For example, if it is desirable to store summary boards with tabulator boards, a combination of units will accomplish this.

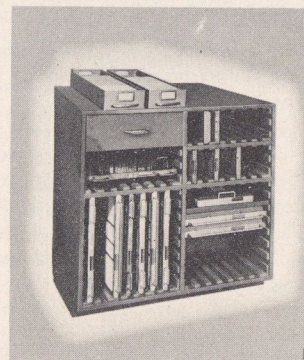
Manufactured by Wright and Company, Inc., Worcester, Massachusetts.



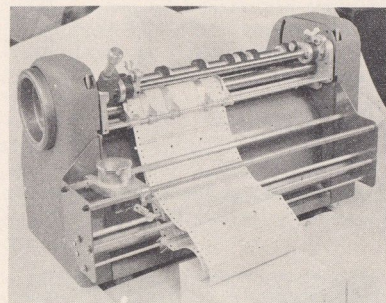
Control Panel Desk: Manufactured by System Sales Company, New York City, is a compact, efficient utilizer of space, providing storage for all control panels, both in the front and back, for files, personal effects, wires, tools, boards and other needs within the operating area.

Styled and designed solely for the punched card accounting machine, it features more than double storage capacity for control panels; complete flexibility for various combinations of all types of control panels; entire utilization of control panel storage space.

The desk is of heavy gauge all-steel construction. The stainless steel bindings, designed to take abuse of heavy trays, are especially constructed for easy removal for any eventual changing of top. It has adjustable glides and a smooth desk top of dual-purpose linoleum. Finished in dark metallic grey.



Control Panel Table-Cabinet: A practical work table in one unit. Holds single, double and triple control panels. Optional shelves and drawers interchangeable on all models. This model has extra large table surface and is open on both sides. Ideal for center of room. Holds 48 triple control panels, or 112 single control panels. Structural members are heavy plywood-presdwood laminates. Friction surfaces of gray stained tempered presdwood. Chip and mar resistant. Toe base for convenience in close-up use. Manufactured by Tab Products Company, San Francisco, California.



Forms Gluing Attachment: Developed primarily for installing on the Universal Burster to glue together the edges of two marginally punched continuous forms before the bursting operation takes place. Interleaved carbon should be removed (before the gluing operation) by a carbon separator as forms are processed over the business machine. The net result, after bursting, is a two-part set glued at the edge without carbon. The attachment, as illustrated, is installed on the Universal Burster.

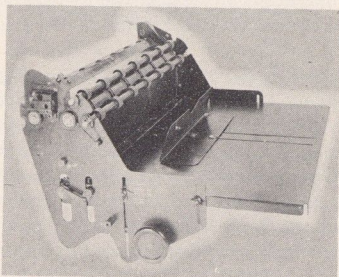
The attachment is not limited to this type of operation, but has other applications. It can be made for use on Burster Imprinter, Rotary Imprinter and similar forms processing machines.

The attachment applies ¼ inch strip of white adhesive cement continuously from the top to the bottom of the form. The adhesive is stored in a container. Its flow is controlled by the operator by

means of a valve located between the container and point of application. The adhesive is applied by a metal applicator that bears against surface of the under copy.

Specific applications to illustrate the possibilities of this attachment are: Parts Tag, prepared in duplicate; Invoices, Purchase Order and Acknowledgment Copy; Filing Jacket; and Shipping Labels.

Manufactured by The Standard Register Company of Dayton, Ohio.

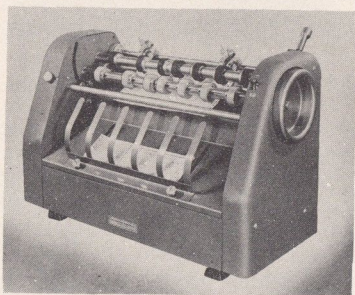


Numerical Sequence Stacker: Stacks forms in positive numerical sequence. It can be attached to Universal Burster, Burster Imprinter, and Rotary Imprinter.

It accommodates forms from 3 inches to 5 inches in length. When forms longer than five inches are burst, the numerical sequence stacker is made inoperative, and forms are stacked by gravity. This machine can stack 11½ inch pack, approximately 1500 forms, depending on weight of paper.

The forms can be removed at any time while machine is in operation. Finished in business machines gray.

Manufactured by The Standard Register Company, Dayton, Ohio.



Universal Burster: Manufactured by The Standard Register Company of Dayton, Ohio, detaches individual forms from a continuous strip at the rate of 12,500 3½ inch forms per hour and other length forms in proportionate times.

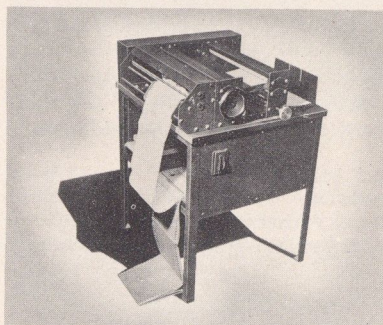
It accommodates standard lengths from 3 inches up through 22 inches and any width up through 19¼ inches. Gears available for standard form lengths; changing from one form length to another requires a change of gears which takes only a few minutes.

Margins up to ⅝ inches may be removed by slitting knives rotating against hardened collars on the pinwheels; margins greater than ⅝ inches require a special collar. Can burst without slitting and vice versa.

Can be equipped to stack in positive numerical sequence up to 1000 sheets in lengths up to five inches. Forms over five inches will stack by gravity. It can be equipped with last check stop switch which stops the machine as the last form passes the switch. Operates on AC or DC current must be specified.

Over-all dimensions are 30½ inches wide, 14 inches long, and 22½ inches high. Weighs approximately 200 pounds. It is possible to decollate a multiple-copy set as one copy at a time is being burst.

Special construction available for multiple copies. Finished in business machine gray.



Forms Burster Non-Imprinting: This variable length burster will trim off control punched margins and burst continuous forms in one operation. Can be used also for bursting alone. Forms may be control punched or unpunched.

Trimming is performed by shearing wheels which give clean-cut edges on either marginally perforated or unperforated forms. Either wheel may be disengaged if one margin is to remain. Both wheels may be disengaged when trimming is not desired.

Bursting unit easily adjusted for any length form from 3 inches to 11 inches and for any width to 18¼ inches. Forms burst exactly on horizontal perforations and are neatly stacked in sequence. No wrinkles or tears. No adjustments necessary for normal variations in grades or weights of paper.

All adjustments easily made without special tools or changing of parts or gears. Full safety features. Simple lubrication. Simple deleaving can be accomplished as shown in illustration.

Length 30¼ inches; width 30 inches; height 39 inches; weight 250 pounds. Running speed is 18,720 per hour for 3½ inch forms, and 5,900 per hour for 11 inch forms. Manufactured by UARCO, Inc., Chicago, Illinois.



Card Tray Truck: The adjustable top encourages efficient card handling. It is light enough to be easily maneuvered within the department and can be used to transport most all departmental operating supplies such as control panels, forms, cards, trays or boxes, etc.

The optional tilt feature quickly changes the top from an operational slope to a flat working surface, thus eliminating the need for space-consuming work tables near the machines.

Manufactured by Wright and Company, Inc., Worcester, Massachusetts.



Mobile Do-All: This sturdy, all-steel, casted unit carries amazing quantities of everything portable—and also doubles as a table-like work surface at the machine.

It has three design features: For close-quarter, narrow-aisle usage, it has a 21-inch turning radius. Four full-swivel wheels enable pushing in any direction without time-consuming jockeying. It has a square tubular steel frame; self-leading edges reinforced to withstand concentrated corner loads; and 4-corner welded bottom shelf. Its built-in strength accommodates mobile loads of 550 pounds, static loads of 880 pounds. The shelves are open on all four sides.

The dimensions are: Width, 22 inches; length, 30 inches; height (to top shelf), 40½ inches; over-all height, 44½ inches; upper shelf spacing, 11½ inches and lower shelf spacing, 6 inches. It is finished in iridescent gray baked enamel. The wheels are 5-inch ball-bearing, solid rubber, and it weighs 80 pounds. Manufactured by Duro Consolidated, Inc., Redwood City, California.



Tabulating Card Racks: These mobile racks occupy comparatively little floor space, yet have an immense tabulating card capacity. The double sided unit has a capacity of 163,800 cards; the single sided unit a capacity of 81,900. Both racks are of all steel construction and are mounted on rubber, swivel, ball-bearing casters. Baked enamel finishes—in your choice of gray or green—are offered.

These mobile units are of tremendous aid in properly handling the moving of cards in large volume sorts. They can also be advantageously used whenever punched cards must be kept at a specific location for a limited period of time; for example, a large payroll. In addition, unpunched and prepunched cards can be housed and easily moved to and from the machines in these mobile racks.

The double sided rack, No. 1200, weighs approximately 235 pounds, crated. The single sided rack, No. 1201, weighs 160 pounds, crated. F. O. B. Mount Vernon, New York. Manufactured by Monarch Metal Products, Inc., Mount Vernon, New York.

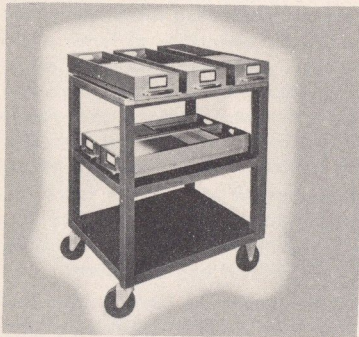


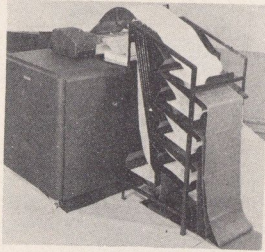
Table-Top Truck: A good-looking, efficiently functioning, sturdy truck gives mobile table-top working surface. Silent, top-quality ball-bearing 5-inch casters give permanence despite hard use.

The flat, clear surface gives extension of working area at table height (37½ inches). Metal binding on top shelf and the beveled edges are chip and mar resistant. The 13¼ inch clearance between the shelves is ample for working and storage. Made of attractive, deep-stained gray presdwood which won't

scratch or mar. The shelves are of rugged plywood. Comes in attractive "tabulating gray" stain.

It has a width of 23 inches, depth of 30 inches. Weighs approximately 65 pounds.

Manufactured by Tab Products Company, San Francisco, California.



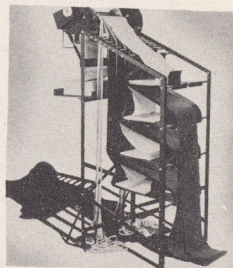
Gravity Carbon Separator: Designed for use with punched card accounting machines only. Provides smooth feeding of continuous forms from flat pack; removes interleaved carbon paper from forms as they issue from tabulating machines; and refolds copies into individual packs on refold trays. Carbon removal and refolding of copies take place by gravity action.

Equipped with adjustable legs for varying height requirements. Form chute, which guides the forms from the machine into the separator, is equipped with a hinged, adjustable lip to provide easy adjustment when inserting forms into the machine. Standard device accommodates a maximum of 5 parts with maximum form length of 11 inches. Can be made special to accommodate a practical maximum of 8 parts with maximum form length of 17 inches.

When used with Remington Rand Models 2 and 3, extensions are applied to all 4 legs and 2 are equipped with casters to facilitate moving. If Model 2 is equipped with Summary Punch, a special chute is required.

When used with IBM Models 402, 403 and 404 a chute extension is supplied, on 405 with Bill Feed attachment, a special chute is required.

Manufactured by The Standard Register Company, Dayton, Ohio.

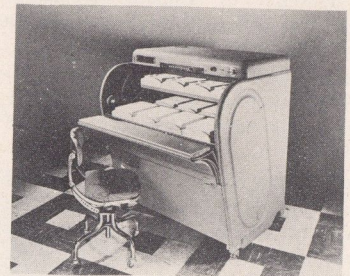


Carbon Deleaver—Gravity Operated: A product of UARCO, Inc., Chicago, Illinois, removes carbon paper from unfastened continuous interleaved forms,

up to and including four plies. It is designed for operation behind tabulating machine, so forms fold by gravity onto respective shelves, with carbon paper ejected onto floor or into receptacle for easy disposal. Forms and carbons easily threaded into proper channels.

A power trimmer unit may be installed to remove control punched margins from either side or both—handling forms up to 18¼ inches wide. With power trimmer, gravity deleaver can be used apart from tabulator. All fastenings must be in control punched margins, not in usable portions of the forms.

With trimmer, the depth is 32 inches; width 27 inches; height 61 inches; weight 141 pounds. It has a running speed of 29 feet per minute. Without trimmer, the depth is 32 inches, width 22½ inches, height 54 inches and weight 87 pounds.

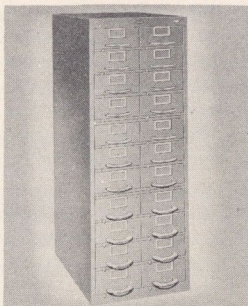


The Simplafind: Manufactured by the Simpla Research & Manufacturing Company, New York City, is a new, compact, speedy motorized card file for tabulating cards and other standard sizes, offers three-second push-button finding. All cards come to the operator within half-arm reach. Ideal for tabulating records requiring active reference or many changes.

The Simplafind handles existing records of every type in all standard card sizes, regardless of condition or kind of paper used, requires no punching, alteration or recopying. May also be used for address plates or other items. Regardless of card size, less than 3 seconds is the average time required to bring a desired record directly before the operator.

Cards are set in light, easily removable angle-end trays with compressor follower. Card trays are only ten inches long and carry approximately 1000 cards each. No special training or instruction for use is required. The regular operator or the person who steps up to the machine for the first time can use it with equal ease and without hesitation.

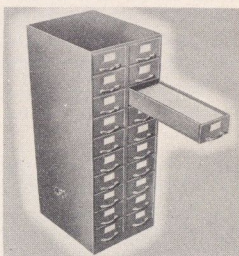
Cards are presented in a series of short (10-inch) rows, all well within comfortable reach. Any card may be easily read without removal from its proper sequence position. There are 4000 to 9000 cards always open before the operator within a half-arm reach front to back or left to right.



Tab Card File: This 22-drawer cabinet is built of steel throughout and is reinforced at every stress point. Its sturdy, solid appearance reflects the detailed engineering and sound construction which assures years of efficient service for every user. Completely redesigned inside and out to hold 90,000 cards. It is equipped with plunger-type master lock available as optional equipment. The corners of heavy steel are double-thick, plus rigid mid-cabinet cross rails. It has full extension, synchronized ball-bearing suspension system and positive thumb latches for each individual drawer cradle.

The over-all dimensions are 20-3/32 inches wide, 28½ inches deep and 54¾ inches high. The crated shipping weight is approximately 400 pounds. The finish is "Slatestone" gray baked enamel and satin-finish plated hardware.

Manufactured by Duro Consolidated, Inc., Redwood City, California.



Fiberglas File: The 3½ pound drawer is so light it substantially reduces heavy tab department work loads. Made of the new miracle material, Fiberglas, the drawer is stronger than steel and wears better. Holds heavy loads and stands heavy shocks without cracking, denting or breaking. It has remarkable dimensional stability, won't warp and the drawers stay straight and true. Fiberglas resists heat, cold, dirt, corrosion, moisture, ageing, acid and alkalis. It won't scratch or mar and the color goes all the way through.

The drawers are wider at top than bottom. This makes it easier to handle groups of cards since they need not be joggled into alignment before placing in drawer. Inward taper makes cards line up as they hit drawer bottom. All this speeds card handling.

The finger hold in bottom front makes it possible to raise squeezed cards from packed drawer. Raised runner protects cards above opening from damage.

Manufactured by Tab Products Company, San Francisco, California.



Wheeldex: Ideal for code files to tabulating records and also handles tabulating cards themselves. Available in various sized units from the smallest desk model carrying 1000 cards and occupying little space, to those holding 100,000 cards or more.

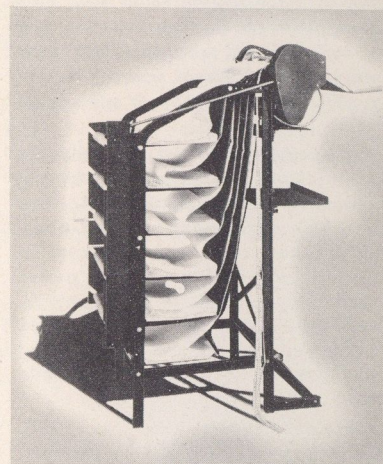
Each Wheeldex unit is a continuous, smooth master ring, with no fixed stops or dividers to destroy flexibility, or force unnatural divisions of undesired groupings of cards. New cards may be inserted or removed at any point without shifting or disturbing the sequence of any of the other thousands of cards. An ingenious automatic stabilizer device assures fast, smooth operation. It permits rotation of the Wheeldex, forward or backward, yet automatically provides a firm writing surface so that entries may be made on any card while it remains on the wheel.

Manufactured by Wheeldex Manufacturing Company, White Plains, New York.



Tabulating Card File: This 20-drawer tabulating card file, manufactured by

Wright and Company, Inc., Worcester, Massachusetts, is equipped with positive, quiet, easy to operate compressors. Plate stops at any position and does not depend on spacing of ratchets. The suspension is ball bearing cradle type, giving easy and fast operation. One cradle supports two drawers. Drawers may be fully extended. Each drawer is individually and easily removable from the file. No withdrawal of cradle is necessary for replacement of a drawer. Simply place and push drawer in opening. Drawers stay closed, no rebound. Rubber bumpers on the suspension eliminate the jar and slam of metal-to-metal contact.



Power Driven—Carbon Deleaver: In one operation the Power Deleaver, manufactured by UARCO, Inc., of Chicago, Illinois, trims off control punched margins and removes one-time carbons from continuous interleaved forms—up to and including six plies. Plies of forms refold evenly on respective shelves. Carbon paper wound on individual spindles. Spindles actuated by motor have simple slip-clutch action which keeps carbon at right tension without tearing. Waste carbon slips off spindles for quick disposal. Empty carbon spindles are dropped into gearbox and mesh automatically without any adjustment.

Correct tension on forms is governed by automatic mercury switch which prevents tabulated forms from pulling on tabulator carriage and causing poor registrations.

Deleaver may be operated either apart from or directly in conjunction with tabulator. Speedily adjusted to any width of forms up to 18¾ inches. Easy adjustment, threading of forms and lubrication. All fastenings must be in control punched margins, not in usable portions of the forms.

The depth is 36 inches; the width, 24½ inches; the height, 60 inches; and weighs 190 pounds. The running speed is 29 feet per minute.



Motor Driven Carbon Separator: This machine is designed to remove interleaved carbon from continuous, multiple-part forms when this cannot be done by gravity as forms leave tabulating machine. It refolds copies into individual packs as carbons are removed.

It is electrically operated by Universal 110 V motor. The forms feed over pinwheels which are movable to accommodate different form widths. The packholder tray is adjustable, up and down, to accommodate large or small packs and provide smooth form feeding.

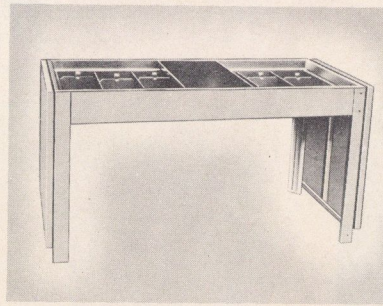
It is intended primarily for use with tabulating forms, but can handle other forms also. It can be used to collate sets of forms as well as separate them by simply reversing the operation.

Standard device accommodates forms up to maximum of 5 parts and 11 inches long. Can be made special to accommodate additional copies and longer lengths up to 17 inches. Can be equipped with slitter attachment to slit forms after carbon is removed. Maximum number of parts that can be slit in one operation is 3 on 13-pound paper. Manufactured by The Standard Register Company, Dayton, Ohio.



Horizontal Tub File: Manufactured by Wright and Company, Inc. of Worcester, Massachusetts, is equipped with a "Roll-Wright" cover. May be ordered with tempered glass posting tray to provide clearer vision, making locating faster and easier. It is shock and impact resistant and has silent roller action.

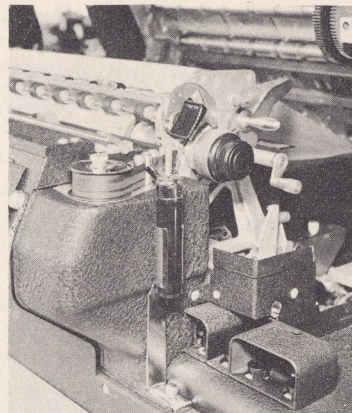
It has 7 removable trays with 1275 more card capacity. The trays are equipped with label holders and disappearing handles. It comes in two heights—30½ and 42 inches and is finished in metallic grey or gunmetal grey. Lock is included.



Steel Tub File: This horizontal tub file, with six compartments, gives maximum economy, in processing interpreted cards where removable trays are not necessary. Seven compartments give 157½ clear filing inches, for 23,625 cards. Finished in standard gray; optional, olive green.

Its counterpart tub file permits combining removable trays with open tub file accessibility.

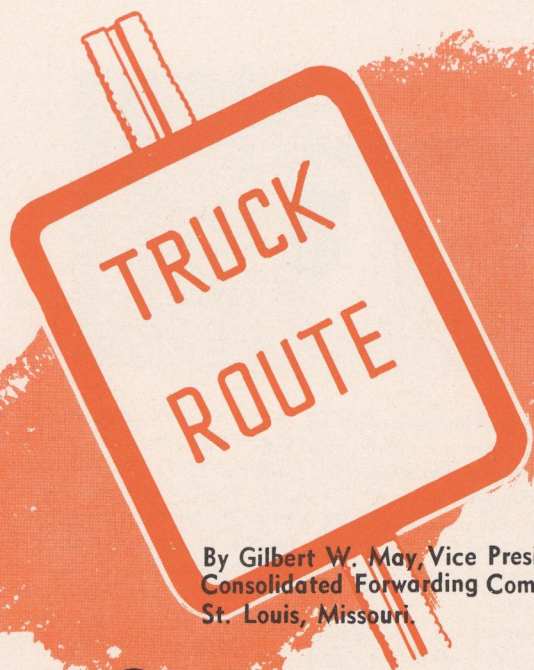
Manufactured by Tab Products Company, San Francisco, California.



Inking Device: An inking device has been developed for use on the IBM 402, 403 and 405 type machines. This new type inking device permits the operator to leave the reservoir in usage almost continuously without constant turning on and off. This is brought about by the recommendation that only one reservoir per machine be used for normal operations.

These inking devices have been in use in the tabulating field for some time and this latest device has been developed to provide better distribution of ink by capillary attraction to give better printing. The wick is of squared cross section set in on an angle. When light contact is made with the roller, a narrow ribbon of ink will transfer; and pushed flush against the roller, a wide band of ink will transfer. This control permits adjustment of the quality of ink flow for light or heavy usage.

Manufactured by Mercury Laboratories, Detroit, Michigan.



Freight Revenue ACCOUNTING

By Gilbert W. May, Vice President
Consolidated Forwarding Company, Inc.
St. Louis, Missouri

ON JANUARY 1, 1947, we began utilizing tabulating equipment to effect our accounting on freight movements by this company.

Since that time, our volume of business has expanded at least 250 per cent. We have increased the number of personnel handling this accounting by approximately 50 per cent — increasing the work load by two-and-a half times and absorbing it by an increase of only one-half in man hours.

As a matter of fact, almost everything about the Consolidated Forwarding Co. has grown since January 1, 1947, except the size of our tabulating installation. Our tabulating room, although located in a new terminal building, contains substantially the same equipment today as it did then.

The fact that our tabulating equipment has served our needs so successfully, we feel, is due largely to the careful thought which went into the purchase and installation of mechanical accounting equipment. For more than a year before we gave up our manual accounting, we made a thorough examination of all available equipment from the standpoint of what services it would offer us and what work we would like it to perform for us.

Revenue Accounting

Our primary concern at the time was to devise an efficient method of computing our revenues in the movement of freight and our payables to other carriers in interline shipments.

The payroll, which now amounts to approximately 600 persons per week, was the major consideration in deciding which tabulating equipment to install. The equipment needed for the larger operation would have cost 40 per cent more than the machines we finally installed. In addition, a payroll, because of its nature, must take precedence over all other accounting work. We were afraid that if our tabulating personnel had to interrupt their routine for the weekly payroll it would hinder our revenue accounting—

which was our main concern in the installation of the tabulating equipment. To be fully protected, we would have had to add extra personnel and equipment to the tabulating department. With only 600 checks a week, we did not feel this would be worth while.

We decided, then, that we wanted revenue accounting first and foremost. And the Remington Rand tabulating equipment which we installed has done an excellent job of giving us the best possible service at the lowest possible cost.

This system, as it operates today, gives us complete statements by the day, week, month and year, of the movement of freight over our routes, our revenues and our interline payables.

Billing Receivables

Every day, each of our 13 terminals sends copies of all the bills on hand at the time the office closes to our main office in St. Louis. As these bills arrive in St. Louis, they are sent immediately to our tabulating room.

There, a separate punched card is made up for each bill. At the end of each working day in the tabulating department, the cards for bills are run through the tabulator, giving us a statement for the revenues for that day. These statements are balanced with the statements of cash received from each of our 13 terminals. By processing cards through the sorter we are able to break down our revenues into any divisions we want.

We sort all of our cards in numerical order by bill numbers every day. Then, we list them on the tabulator in an arrangement where the bill numbers are recorded in sequence. The missing numbers can be spotted easily. They are entered in a book used especially for checking on missing bills and are referred to periodically until each bill is accounted for.

After these records have been completed, the cards are sorted again so that the paid and unpaid bills may be filed separately. The cards for the unpaid bills are kept in an open file, to be pulled and credited when they are paid. In the case of interline accounts where we have to render a statement at the end of the month, two cards are punched for every bill. One of these is placed in the open file with the other unpaid bills, the other is turned over to our interline clerk, who verifies all the charges on the cards and sends them to the tabulating room to be run off on a statement at the proper time.

Probably one of the greatest labor saving features of our tabulating installation is the man-

ner of crediting payment of bills. No searching for cards or ledger entries is necessary. We merely punch another card, listing the bill number, invoice amount and payment data. Then the payment cards are run through our collating reproducer simultaneously with our unpaid bill cards. This machine automatically matches the paid and unpaid cards by bill number and control punches the payment information into the unpaid card. These are now paid cards and can be run with our daily revenue statement.

Each week, we run a summary of revenue on the tabulating machine as a guide to our main office executives and terminal managers. Our monthly operating statements are completed within three days after all information needed is received from the terminals. Our tabulated statements are usually finished around the tenth of the month.

All of the above procedure has dealt with receivables. However, there is little difference in the method used in computing interline payables. The interline payable figures are balanced separately and checked against disbursements for each of our branches.

General Accounting By-Products

An important "extra" furnished by the tabulators is a detailed statement of maintenance and line haul costs on each one of our 600 pieces of equipment. This is information which we never had in detail form before. The tabulating department has been able to absorb the extra work of supplying this information along with keeping up with the increased volume of freight revenues.

Every time anything is done to any piece of equipment, from filling a gas tank to major mechanical work, a card is punched and filed with others for the same vehicle. On road equipment, the information from all trip tickets is punched into proper cards. This includes tonnage, distance, destination and wages paid to the driver.

The information gathered from these vehicle tabulating cards has a number of important values:

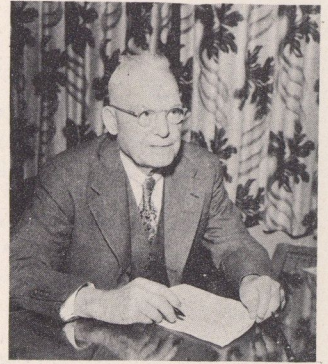
1. Tax regulations in some of the states in which we operate require that we furnish mileage reports to highway officials. The tabulating installation gives us this information promptly and accurately.
2. By pulling totals for mileage and fuel consumption for a vehicle, we know exactly how many miles per gallon each piece of power equipment is averaging.
3. Our costs for garage bills for each vehicle help show us which manufacturer's equipment is giving the best service.
4. We have exact figures on tonnage moved by each terminal, broken down by destination.

Modernization in office procedures, we have learned, is as important to a growing motor freight business as the modernization of its trucks and materials handling equipment.

... about the company



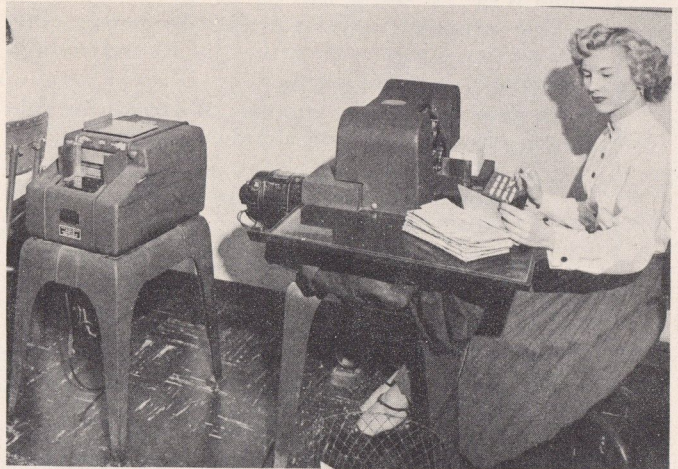
Gilbert W. May
Vice-President



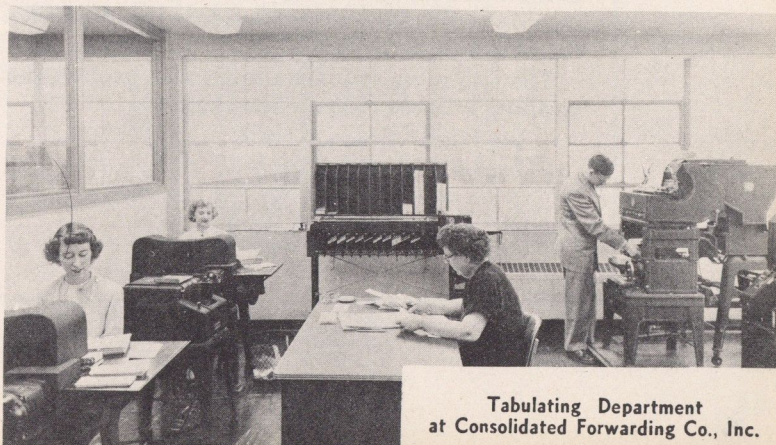
I. M. (Dad) Scheibe
Chairman of the Board

Consolidated Forwarding Company, Inc., offers a good example of transportation progress, both on the road and in the office. In 1884, I. B. "Dad" Scheibe bought a horse and wagon and founded the Triangle Transfer Company. "Dad" went on to buy other horses and wagons, replacing them later with trucks. By 1932, he had bought out a number of trucking interests. These were incorporated as the Consolidated Forwarding Company, Inc. At 80, "Dad" is active in the firm, serving as Chairman of the Board, while his son, I. B. "Irv" Scheibe, has taken over the Presidency.

This St. Louis company houses 600 modern pieces of equipment. However, modern equipment is only one phase of the tremendous progress in the motor freight industry. The well planned tabulating reports, processed every day, are necessary to keep up to date with the larger, mechanical, systematized operation and is another important indication of the progress of this company.



Manual key punch and interpreter unit



Tabulating Department
at Consolidated Forwarding Co., Inc.

Rules for the Administration and Interpretation of the Results of the Test for Card Punch Operators

By E. T. JOLLIFFE

THIS TEST for card punch operators is designed only for the specific purpose of determining the ability of the applicant to read numbers and to transfer them to tabulating cards in terms of finger positions on a punch keyboard. The test is composed of numbers which are of a wide range of finger combination difficulty.

Before the test is administered, there should be about a five-minute period of instruction in the mechanical operation of the punch machine and, in addition, about a five-minute practice period using a set of numbers not a part of the test, following which the applicant is required to proceed with the test under normal working conditions without further questions. A record is kept of the starting and finishing time and the number of cards spoiled, the applicant being requested to save such cards.

The percentile tables have been compiled on the basis of actual tests given and may be used to determine percentile rankings. As will be noticed in the accuracy percentile tables, the number of cards spoiled is used in connection with the number of errors in determining the percentile rating. The speed percentile table is based on a record of time spent on the test to the closest five seconds.

The composite score is derived by multiplying the accuracy percentile rating by 10 and adding the speed percentile rating.

In determining the number of errors, the following factors were taken into consideration:

1. The number of errors is the number of punching errors, not the number of cards on which errors appear.
2. A transposition is considered a single error.
3. A series of "off row" punches such as 4, 5, 6, 7 for 1, 2, 3, 4 is considered a single error.
4. An omission or duplication of a number which results in the remainder of a card being off column, or the omission or duplication of a card is considered a single error.

Included with the record for each individual is a set of columns for types of errors. These figures are valuable only insofar as, other things being equal or nearly equal, it may be that the types of errors will bear some weight in making selections. Usually reading errors are considered more serious than mechanical errors.

The following set of examples will explain the meaning of these column headings:

Too High—1 for 4, 6 for 9.

Too Low—4 for 1, 9 for 6.

One Less—1 for 2, 6 for 7.

One More—2 for 1, 7 for 6.

Omit—A number or a card left out.

COMPOSITE PERCENTILE TABLE

Composite	Percentile	Composite	Percentile
1046	98	532	48
1040	96	518	46
956	94	514	44
952	92	506	42
946	90	488	40
914	88	470	38
888	86	400	36
876	84	382	34
875	82	354	32
874	80	350	30
872	78	288	28
834	76	284	26
824	74	280	24
798	72	264	22
756	70	246	20
714	68	226	18
690	66	212	16
684	64	178	14
680	62	176	12
662	60	160	10
610	58	142	8
594	56	128	6
588	54	102	4
562	52	48	2
558	50	32	0

SPEED PERCENTILE TABLE

Time		Percentile	Time		Percentile
Min.	Sec.		Min.	Sec.	
70	15	98	95	15	48
74	00	96	95	30	46
76	30	94	96	25	44
80	30	92	97	20	42
82	00	90	97	40	40
82	30	88	97	55	38
82	35	86	98	55	36
82	40	84	100	05	34
82	50	82	101	00	32
83	30	80	101	20	30
84	00	78	105	15	28
85	05	76	106	00	26
85	30	74	107	15	24
85	40	72	107	35	22
86	40	70	108	40	20
87	00	68	110	05	18
88	20	66	111	05	16
88	30	64	111	10	14
89	10	62	111	35	12
90	00	60	114	15	10
90	30	58	115	20	8
91	15	56	116	00	6
91	30	54	116	20	4
93	00	52	117	50	2
93	40	50	120	05	0

ACCURACY PERCENTILE TABLE

Errors			Errors		
	Cards Spoiled	Percentile		Cards Spoiled	Percentile
0	10	98	23	19	48
1	5	96	27	14	46
1	10	94	27	15	44
2	2	92	27	16	42
2	10	90	33	17	40
3	8	88	33	29	38
7	9	86	34	28	36
8	5	84	34	50	34
8	10	82	36	16	32
8	12	80	37	18	30
8	15	78	39	30	28
9	11	76	41	05	26
10	13	74	44	23	24
10	15	72	46	52	22
11	17	70	48	18	20
12	7	68	50	12	18
13	6	66	54	30	16
13	7	64	58	13	14
13	15	62	65	15	12
17	13	60	76	21	10
17	14	58	90	12	8
18	17	56	108	55	6
21	12	54	125	29	4
21	14	52	127	13	2
22	7	50	209	60	0

Continued on Page 69

Key Punch Operators Test

00	00	03	04	05	06	07	08	09	04	07	02	05	08	03	06	09	01	05	09	03	05	07	09
01	02	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
03	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
04	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62
05	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
06	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
07	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92
08	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02
09	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12
10	12	34	56	78	99	87	65	43	21	02	04	07	03	69	25	81	45	78	20	31	64	37	00
11	04	23	97	60	10	59	60	47	28	50	39	52	04	58	96	01	98	05	02	03	06	09	17
12	00	11	22	33	44	55	66	77	88	99	91	61	01	34	78	05	02	03	06	09	07	17	42
13	12	21	23	32	34	43	55	54	56	65	67	76	78	87	89	98	97	64	31	21	54	87	13
14	03	69	96	30	25	88	52	14	77	41	02	50	58	08	43	47	37	73	25	35	80	14	17
15	13	31	46	64	79	97	20	02	53	35	86	68	91	19	64	46	37	73	07	70	52	08	14
16	90	09	09	64	07	20	75	37	68	94	02	17	50	39	51	47	05	84	02	73	89	51	00
17	10	24	35	76	89	98	67	53	42	01	42	37	56	80	14	78	96	30	25	85	21	14	70
18	98	78	96	54	56	33	21	23	04	37	97	07	46	85	14	07	85	20	96	11	40	58	99
19	95	16	20	84	78	67	32	14	07	89	50	45	78	90	24	68	10	69	54	05	87	20	05
20	02	40	05	70	08	60	95	28	52	45	76	51	65	26	50	62	58	07	53	72	07	72	14
21	01	23	48	67	89	01	23	45	67	89	01	23	45	67	89	01	23	45	67	89	01	23	45
22	98	76	54	32	10	98	76	54	32	10	98	76	54	32	10	98	76	54	32	10	98	76	54
23	98	70	65	40	32	10	91	23	94	56	97	82	45	32	78	92	05	73	48	96	10	84	05
24	03	56	96	30	39	69	39	96	30	39	69	30	30	60	90	03	06	09	0				

PUNCH OPERATOR'S TEST RESULTS

100 CARDS - 50 COLUMNS

Applicant No.	Too High	Too Low	One Less	One More	Omit	Re-seat	Trans-position	Misc.	Total Errors	Cards Spoiled	Speed		Percentile Acc.	Composite		
											Min.	Sec.		Score	Title	
1	56	20	12	1	20	7	1	10	127	13	105	15	2	28	48	2
2	5	9	7		4		1	1	27	15	87	00	42	68	488	40
3	25	28	22	5	5	5	10	11	108	55	82	50	6	82	142	8
4	14	13	10		4	2	1	1	44	23	96	25	24	44	284	26
5	22	5	2		1	1	1	2	34	50	97	20	34	42	382	34
6	3	1	4	5	14	4	3	4	38	16	100	05	32	34	354	32
7	3	4	1	1	6		2	4	21	12	91	30	54	54	594	56
8	1		1	1	27	1	3		34	28	70	15	36	98	558	50
9					5	1	3	3	12	7	114	15	68	10	690	66
10	12	1	4		1		1	2	21	12	95	15	54	48	588	54
11	2	1	4		6	1		3	17	14	101	20	58	30	610	58
12	1				1				2	10	95	30	90	46	946	90
13	1		3	5	3	1	1	3	17	13	89	10	60	62	662	60
14	29	13	11	2	10	3	5	17	90	12	107	35	8	22	102	4
15		1	2	1	15			3	22	7	111	10	50	14	514	44
16	1	2			2		1	2	8	5	85	30	84	74	914	88
17	107	25	42	4	9	7	2	13	209	60	101	00	0	32	32	0
18	4	1	6	1	14		5	2	33	17	86	40	40	70	470	38
19	2	4		1	1				8	12	85	05	80	76	876	84
20	23	9	3	1	11	1	4	3	46	52	116	00	22	6	226	18
21	1		1	3	4			1	10	15	84	00	72	78	798	72
22	1			1	1	1		4	8	10	93	00	82	52	872	78
23					4	2	1		7	9	111	05	86	16	876	84
24					11		1	1	13	15	76	30	62	94	714	68
25	2	3	8	2	3	2	3		23	19	106	00	48	26	506	42
26	19	35	2		7	8	2	3	76	21	90	00	10	60	160	10
27	15	4	12	2	8	1		6	48	18	82	30	20	88	288	28
28	5	11	6		7	1		7	37	18	93	40	30	50	350	30
29	3		3	2	26	2	3	2	41	46	116	20	26	4	264	22
30	55	21	16	2	16	6	3	6	125	29	82	30	4	88	128	6
31	7	2			9	3	3	3	27	15	80	30	44	92	532	48
32	13	13	6	7	12	6	3	5	65	15	82	00	12	90	212	16
33					1				1	10	111	35	94	12	952	92
34		3			2	1	1	1	8	15	74	00	78	96	876	84
35	7	4	7		14	4	3	5	44	13	64	05	25	99	349	31
36	2	1		4	5	10	1	4	27	32	123	20	41	0	410	37
37					1			1	2	2	98	55	92	36	956	94
38	1	1	2	1	4		1	1	11	17	91	15	70	56	756	70
39		2			5	4		2	13	6	107	15	66	24	684	64
40	3	8	1	2	4	1	3	6	27	14	90	30	46	58	518	46
41	1	5						3	9	11	85	30	76	74	834	76
42			1			2			3	8	115	20	88	8	888	86
43	1	3	2		14	1	5	7	33	29	108	40	38	20	400	36
44									0	10	88	20	98	66	1046	98
45					1				1	5	83	30	96	80	1040	96
46	4	13	3		7	2	3	7	39	30	120	05	28	0	280	24
47	1	1			7		2	7	18	17	117	50	56	2	562	52
48	6	7	2	1	33	1	7	1	58	13	97	55	14	38	178	14
49	10	10	3	5	5	5	7	5	50	12	88	20	18	66	246	20
50	1		1		8	1	1	1	13	7	97	40	64	40	680	62
51	3			1	4	1		1	10	13	82	40	74	84	824	74
52	1	11	9	2	8	8	7	8	54	30	110	05	16	18	178	14
53		1			3				4	10	112	05	87	11	881	85
54	3		2	1	1	2		1	10	13	80	00	74	93	833	75
55	3	3	1		5	7	1	2	22	10	90	20	51	59	569	53
56					6	3			9	1	92	31	77	53	823	73
57	13	3	5	3	4	3	2	8	41	45	107	10	27	25	295	29
58	14	4	12	2	5	6	1	4	48	39	124	05	19	0	190	15
59	20	12	15	2	21	11	8	9	98	39	118	05	7	1	71	3
60	10	4	3	1	8	5	3	3	37	26	92	20	29	53	343	29
61	23	6	6		1	6		5	47	23	87	25	21	67	277	23
62			1		18	5	1		25	15	100	40	47	33	503	41
63	1	2	1		10	3	1	2	24	10	88	05	47	87	537	49
64	48	4	4	3	4	7	5	5	80	39	67	15	9	99	189	15
65	1	1	1		4	8	1	1	17	12	110	50	61	17	627	59
66			1		11	5	1	1	19	15	93	25	55	51	601	57
67	1	3			11	2	1	2	20	27	106	20	55	25	575	53
68		1	1		4				6	8	81	25	87	91	961	95
69	1	1			9	5	2	1	19	18	112	40	55	11	561	51
70	1				5	1	4	2	13	9	101	30	63	29	659	59
71						2		3	5	4	104	35	87	29	899	87
72			2	1	2		1		6	14	111	05	87	16	886	85
73		2	1		7				10	15	101	45	72	29	749	69

Sales Control and Analysis in a Job Shop

By Norman M. Salt

THE De Laval Steam Turbine Company, of Trenton, New Jersey, was founded in 1901 to manufacture steam turbines, pumps and centrifugal compressors. In half a century it has grown to an organization of over 2000 people, and its product lines have grown to include worm gear speed reducers, IMO rotary pumps, and propulsion machines for both merchant and Naval vessels. Modern turbines are available to 20,000 horsepower. Large De Laval blowers supply up to 125,000 cubic feet of air per minute for blast furnaces. Eighty per cent of American cities over 100,000 population use De Laval pumps. Over 90% of all merchant marine vessels over 1000 tons now under construction will have De Laval equipment aboard. Refineries, pipelines, paper mills, food plants, coal mines, steel mills and powerhouses, all are users of De Laval equipment.

Basic equipment like this is almost always engineered to customers' specifications. We have very few stock items, so our Cost Accounting and Work Planning is quite a different problem from the average factory handling production items. Although we use tabulating equipment in cost distribution, I will deal primarily with punched cards in sales analysis and planning.

Because we do carry so few stock items, our planning is based on orders already booked rather than how much stock we have on hand. To plan future operating costs and provide necessary help, equipment and material, we must have an accurate picture of the backlog at all times. We get this, plus all necessary sales analysis, from one basic deck of punched cards.

The following information is punched for each order in our backlog:

- 1—Promised shipping date
- 2—Manufacturing Division
- 3—New machine or repair
- 4—Type of Industry placing order
- 5—Agent and Territory
- 6—Sales order number
- 7—State code where assigned
- 8—Type of Product
- 9—Sales value
- 10—CMP rating
- 11—If it is a renegotiable contract.

At the close of each month, all new orders, revisions, cancellations and shipments are sorted by sales order numbers with the previous month's backlog. The tabulator adds in the new orders and debit revisions and subtracts cancellations, credit revisions and shipments. It summary punches the new backlog while printing a detailed list of each order. The new backlog is used for CMP reports, cash and profit forecasts, renegotiable contract information, etc.

A summary of new orders, revisions, cancellations and shipments give us a variety of sales analysis figures. Some of our regular reports include:

1—A statement showing for each type of product: Backlog at beginning of year—orders booked and cancellations to date—shipments to date—back log to date.

2—A statement showing the above information for each sales office and representative.

3—A statement showing orders booked by product and also by type of industry. This report shows the Sales Manager how product lines are moving and permits concentration on slow items.

By-products of this operation furnish us with the necessary information to make our State Sales & Use Tax Reports, Royalty Reports, Product Profit Analysis, Priority Reports, Government Reports on renegotiable contracts and miscellaneous general and cost accounting data.

All sales statements are tabulated on fluid process masters which allows us to distribute as many copies as desired. Many of these masters are used for trend statements and include five months' information prior to re-typing. Each month is added to the original master and the to-date figure changed prior to obtaining the month's statement. Master cards are used which show sales offices and representatives by name. This eliminates the deciphering of codes.

The sales order number is also used on job cards in the plant. This ties the cost information in with the sales information. We then have a comparatively easy job in getting all reports to balance out because of the fact that they originate from one place. Errors can be systematically traced from the source. We find that we get a reasonably accurate overall picture of sales, costs and trends with a minimum amount of time and expenses.

... About the Author:

Norman M. Salt, Tabulating Supervisor of De Laval Steam Turbine Company, has twelve years' experience in tabulating work. He started in 1940 in the Census Bureau and became assistant section chief and later section chief. In 1942, he enlisted in the Navy and received an IBM specialist rating and worked for over three years in secret work in Washington and Pearl Harbor. After the war, he returned to the Census Bureau and worked in the 1945 Agricultural Census. Later transferred to the Navy Department where he became Production Supervisor in the Chief of Naval Operations Tabulating Unit. Worked as Tabulating Project Planner for the Army in the Adjutant General's office before coming to his present position.

He is President of the Trenton Chapter of the National Tabulating Management Society. Courses in Procedure Writing and Methods Work at the Department of Agriculture Extension School, and Accounting and Commercial Law at Rider College furnish his educational background.



Daily Accounting Registers of Disbursement and Collection Transactions

Brigadier General John R. Gilchrist
Center Commander

AIR FORCE FINANCE CENTER
DENVER, COLORADO

THE DEPARTMENT OF THE AIR FORCE fiscal accounting system is the recordation and reporting of financial and budgetary transactions relative to the operation of the Air Force and involves the administration of funds established by Act of Congress. The amounts appropriated by Congress are provided on the basis of budgetary estimates compiled by the department and submitted to Congress through the Bureau of the Budget and the President, identifying the uses to which such funds will be placed in the fulfillment of its operating mission. It is the responsibility of the accounting division at the Air Force Finance Center to maintain accurate and current tabulations of expenditures according to appropriate apportionments by the Bureau of the Budget.

In order to accomplish this accountability for the global Air Force, an accounting classification system has been established to maintain the identity of financial and budgetary transactions as to the factors of fund distribution, restrictive limitations, and the purposes for which funds may be utilized. These classifications appear on all accounting documents which serve to record the specific transactions involved.

Registers of disbursement and collection transactions recorded by the Accounting Division are prepared on a daily basis in order to produce a basic record in detail form of such accounting transactions. The registers are used for audit and reference purposes. Summary cards containing the data necessary for the preparation of summary accounting records and reports are produced as a by-product.

Document Preparation

Finance Officers' accounts, consisting of all Finance Officers' vouchers processed in any one day, are received, blocked and examined in the Preparations Branch. Each type of transaction is blocked separately and each block contains a maximum of 150 Finance Officers' vouchers.

Key Punch and Key Verification

Constant information relating to Finance Officer data is key punched into the first detail card of each block which is used as a master card to gang-punch the constant information into all other detail cards relating to that block. Codes relating to Appropriation Department, Fund Type, Fiscal Year, Continent and Country, Transaction Type, Finance Officer Department and Accounting Office are supplied by the key punch operator from information that is reflected on the documents. Other data is key punched as reflected on the documents.

Brigadier General John R. Gilchrist

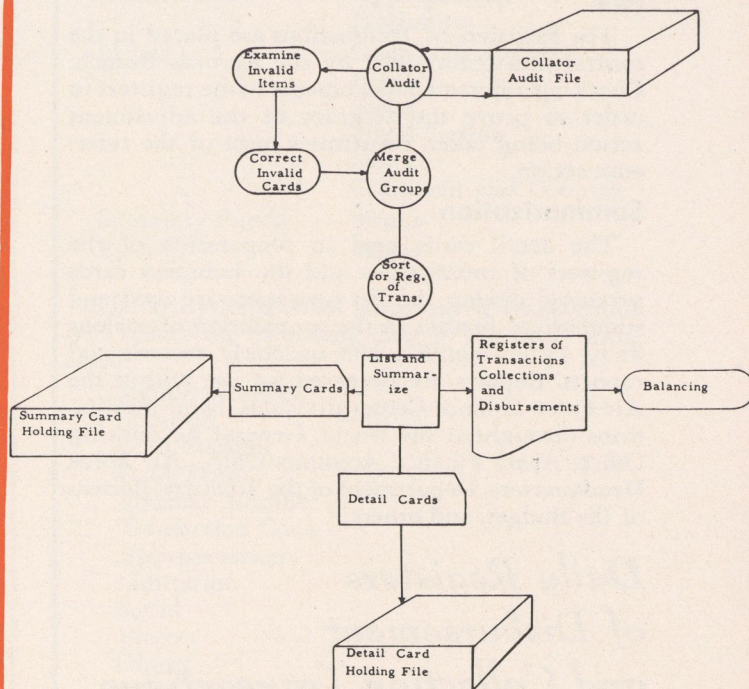
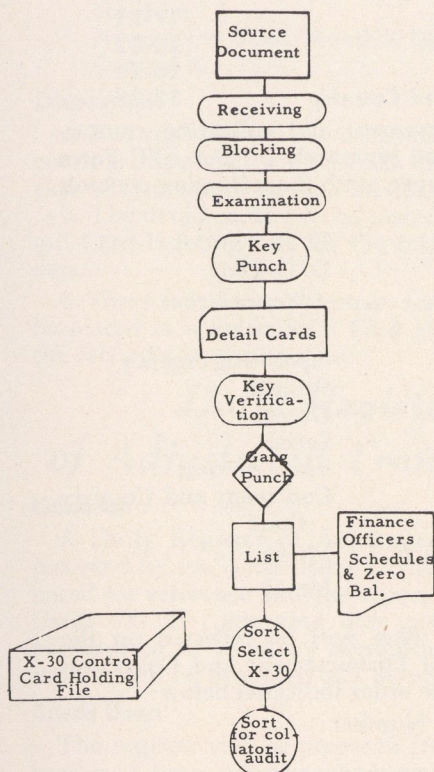
A graduate of West Point who has served the Army and Air Force at home and overseas, has had many years' experience in finance, management, and personnel administration, and has been Commander of the Air Force Finance Center since activation. Under General Gilchrist's direction, the Air Force Finance Center has established the use of the latest electronic business machines, many of which have a dual purpose and can be used for several complex operations in order to fulfill the financial mission of the global Air Force.

AIR FORCE FINANCE CENTER Denver, Colorado

The Air Force Finance Center, activated at 3800 York Street in Denver, January 1, 1951, is a permanent Air Force installation established under the direct control of the Chief of Staff, United States Air Force, with technical supervision by the Directorate of Finance, Headquarters, USAF. The mission of the Air Force Finance Center is, in simple terms, one of serving the Air Force, its personnel and their dependents. A few of its more important functions are the payment of allotments to dependents and to authorized financial institutions, payment of Government Life Insurance premiums, issuance of savings bonds for certain overseas personnel, maintenance of a savings system for airmen, and funding of Air Force finance officers throughout the world. It also administratively examines all military pay records, exercises technical supervision over the Air Force Finance network, and receives and processes all accounting documents pertaining to disbursements made and collections received by finance officers.

ments. An X-30 control card containing Finance Officer data and the total amount of the block or blocks is key punched for use as a subsequent balancing medium. Key verification is accomplished in the same manner as the key punching.

the Punched
Card



Items in question are manually verified with the Air Force Fiscal Code.

Proof Balance Operation

(1) *Gang-Punch Operation.* Finance Officer data previously key punched into the first detail card of each block is gang-punched into all detail cards of the block.

(2) *Preparation of the Disbursing Officer Schedule and Proof Balancing Detail Cards.* A schedule of transactions is prepared to accompany each account by listing the detail cards in the same sequence as the vouchers in the block.

The X-30 control card is listed at the end of each schedule and is compared with an overall total accumulated and printed by the accounting machine to balance the detail cards. A difference figure is reflected if the X-30 control total and the accumulated detail total are not in agreement. Differences are analyzed and corrected. The X-30 control cards are placed into a holding file for subsequent use in preparation of Finance Officer controls.

Collator Audit

(1) *Sort.* The open allotment, reimbursement and specific allotment detail cards are divided into separate groups and each group is sorted into appropriation and minor accounting classification sequence.

(2) *Collator Audit.* The collator audit is per-

formed in order to prove the validity of each detail card. Open allotment classifications are audited against a master file which contains appropriation, limitation, operating agency, serial, project and fiscal station. Army specific allotments, Army and Air Force reimbursement and receipt account classifications are audited against a master file which contains appropriation and limitation. Air Force specific allotment classifications are audited against a master file which contains appropriation, limitation and operating agency. Detail cards that do not match information punched into the master cards are examined for validity and correctness of accounting data. Cards containing incorrect or invalid classifications are corrected and finance officers are advised if the documents are in error.

Preparation of the Daily Register of Transactions

(1) *Merge.* The Audit groups are merged together by appropriation and minor accounting classification.

(2) *Sort.* The detail cards are sorted into Finance Officer sequence in order to prepare separate registers for each Finance Officer account.

(3) *List.* The detail cards are listed to provide a permanent detail record of each Finance Officer's activity. Summary cards are produced on each minor control and placed into a holding file for use in preparation of various summary records and reports.

(4) *Balancing.* The registers are balanced to a Daily Finance Officer control prepared from the X-30 control cards.

File

The Registers of Transactions are placed in the central files maintained by the Records Branch. Checking adjustment documents to the registers in order to prove the accuracy of the adjustment action being taken constitutes most of the reference action.

Summarization

The detail cards used in preparation of the registers of transactions and the summary cards produced during the list operation are used and summarized further in the preparation of various daily, cycle, monthly and quarterly records and reports. Reports are prepared for use within the Air Force Finance Center divisions, fiscal installations throughout the world, General Accounting Office, Army Finance Accounts Office, Air Force Headquarters, Department of the Treasury, Bureau of the Budget, and others.

Daily Registers of Disbursement and Collection Transactions

Purpose

This publication prescribes the procedures for the preparation of Registers of Disbursement and Collection Transactions.

General

Registers of disbursement and collection transactions recorded by the Accounting Division will be prepared on a daily basis in order to produce a basic record in detail form of such accounting transactions. The registers will be used for audit and reference purposes. Summary cards containing the data necessary for the preparation of summary accounting records and reports will be produced as a by-product.

Cards Used

Detail account cards produced from collection and disbursement documents (Transaction Codes 5 and 1) will be used in the preparation of the registers, and will be available upon completion of the daily detail collator audit.

Operating Procedure

a. *Sort.* The cards will be sorted in the following sequence, major to minor:

Field	Column(s)
Transaction Code	67
D. O. Department	68
D. O. Symbol	69-72
D. O. Date	62-66
Appropriation Department	1
Fund Type	2
Basic Symbol	7-10
Fiscal Year	3-6
Limitation	11-13
Operating Agency	14-16

Field

Column(s)

Project	22-25
Serial	17-21
Fiscal Station	28-32
Object	26-27
Continent and Country	33-35

b. *List.* Disbursement and collection transactions will be listed separately on DA-AFC Form 1-188, one-part paper, with the following controls and totals:

Major	D. O. Symbol D. O. Date
Intermediate	Appropriation Limitation
Minor	Operating Agency Project Object Serial Fiscal Station Continent and Country Code
Summary Punch	Minor
Eject	Major

The following data will be reflected on the Daily Registers of Disbursement and Collection Transactions in the order indicated below:

D. O. Station Number
Location
D. O. Symbol Number
D. O. Date
Voucher Number
Transaction Code
Appropriation
Limitation
Serial
Project
Object
Fiscal Station
Continent and Country
Accounting Office Number
Amount
Accounting Date
Block Number
Bureau Voucher Number

c. *All-Purpose Summary Cards (X-78).* All-Purpose Summary Cards (X-78) containing the following data will be produced during the preparation of the Registers:

Field	Column(s)
Appropriation Department	1
Fund Type	2
Fiscal Year	3-6
Basic Symbol	7-10
Limitation	11-13
Operating Agency	14-16
Serial	17-21
Project	22-25
Object	26-27
Fiscal Station	28-32
Continent and Country	33-35
Amount	36-45
D. O. Date	62-66
Transaction Code	67
D. O. Symbol	68-72

Field	Column(s)
Accounting Office Number	73
Location	76
Accounting Date (Month & Day)	77-80
Control X	78

Disposition

a. The registers will be transmitted, as each account is completed, to the Audit and Analysis Section of Operations Branch for further processing.

b. The detail cards will be placed in a Daily Detail Card Holding File for the related accounting date.

c. The All-Purpose Summary Cards (X-78) will be placed in a Daily X-78 Card Holding File for the related accounting date.

Daily Register of Adjustment Transactions

General

A Daily Register of Adjustment Transactions recorded by the Accounting Division will be prepared for reference and audit purposes. Summary Cards (X-78) containing data necessary for the preparation of summary accounting records and reports will be produced as a by-product.

Cards Used

The register will be prepared from detail cards produced from adjustment documents (Transaction Codes 4, 8, 8X and 9) and will be available upon completion of the daily detail collator audit.

Operating Procedure

a. *Sort.* The cards will be sorted into the following sequence major to minor:

Field	Column(s)
Transaction Code	67
Transaction Code X	69
Charge or Credit (Transaction Code 8, 8X and 9)	X-36
Appropriation Department	1
Fund Type	2
Basic Symbol	7-10
Fiscal Year	3-6
Limitation	11-13
Operating Agency	14-16
Project	22-25
Serial	17-21
Fiscal Station	28-32
Object	26-27
Continent and Country	33-35

The foregoing sort will result in seven groups of cards as follows:

- Transaction Code 4
- Transaction Code 8 (No X-69 and No X-36)
- Transaction Code 8 (No X-69 and X-36)
- Transaction Code 8X (X-69 and No X-36)
- Transaction Code 8X (X-69 and X-36)
- Transaction Code 9 (No X-36)
- Transaction Code 9 (X-36)

b. *List.* Each of the aforementioned groups will be listed separately on one-part DA-AFC Form 1-188 tabulating paper, with the following controls and totals:

Major	Transaction Code Transaction Code X X-36
Intermediate	Appropriation Limitation
Minor	Operating Agency Project Serial Fiscal Station Object Continent and Country
Summary Punch Eject	Minor Major

The Daily Register of Adjustment Transactions will reflect the following data in the order indicated:

- Station Number
- Location
- D. O. Symbol
- D. O. Date
- Voucher Number
- Transaction Code
- Appropriation
Limitation
- Serial
- Project
- Object
- Fiscal Station
- Continent and Country
- Asterisk (Transaction Code X)
- Amount
- Accounting Date
- Block Number
- Bureau Voucher Number

c. *All-Purpose Summary Cards (X-78).* All-Purpose Summary Cards will be produced during the foregoing operation and will contain the following data:

Field	Column(s)
Appropriation	1-10
Limitation	11-13
Operating Agency	14-16
Serial	17-21
Project	22-25
Object	26-27
Fiscal Station	28-32
Continent and Country Code	33-35
Amount	36-45
Transaction Code	67
Transaction Code X	69
Accounting Office Number	73
Location	76
Accounting Date	77-80
Control X	78

Disposition

a. The registers will be transmitted to the Audit and Analysis Section of Operations Branch for audit.

b. The detail cards will be placed in the Detail Card Holding File for the related accounting date.

c. The All-Purpose Summary Cards (X-78) will be placed in the Daily X-78 Card Holding File for the related accounting date.

Card Punch Operation of Military Pay Records

AIR FORCE FINANCE CENTER
DENVER, COLORADO

THE MILITARY PAY RECORD is the individual permanent record of all payments and deductions made for each member of the Air Force, WAF, airman or officer, and a new record is made each six months. At the end of the six months' period these records, reflecting an individual account for each Air Force member, are sent to the Air Force Finance Center where the military pay division performs an administrative examination of all closed military pay records and a comprehensive examination of all irregularly closed military pay records, to furnish technical advice concerning entries made on the MPRs and to extract pay record data for accounting, budgetary and statistical purposes.

By combining the functions of the examination and the accumulating of pay record data onto punched cards, the operation can be accomplished with accounting machines at a saving of comptometer operators and a large degree of manual verification.

The military pay records are received in the key punch and verification section in blocks of approximately 100 documents from a mail processing section receiving documents from Air Force Finance Officers throughout the world. By using these blocks, the MPRs are controlled through the entire accounting operation. The blocks of MPRs are distributed to the key punch operators who punch the following IBM cards:

(a) A block control card reflecting the indicative data for the block.

(b) A card for the total credits on the MPR including the indicative information for the individual such as name, service number, etc.

(c) A card for each entry on the MPR, with the factors necessary for a lateral extension. The factors required are as follows:

- (1) Rate Code, i.e., 0 monthly rate, 2 daily rate.
- (2) Number of months.
- (3) Number of days.
- (4) Daily or monthly rate.
- (5) Account code.

Exhibit No. 1 shows the MPR and the cards punched from it.

Upon completion of the key punch operation, the cards are processed through the Type 604 Electronic Calculator for intersperse gang-punching and extending. The data in the block control card will be gang-punched into all the cards for the block. An X-punch in the control card will indicate to the machine that a new block is passing through the machine. The information in the total credit card will be gang-punched into all the cards for an individual Military Pay Record. The total

credit card is a no-X Master. Therefore, the machine will recognize a new total credit card by the absence of an X-punch. Simultaneously with the gang-punch operation, the lateral extension will be performed using the factors punched in the cards, for example:

(a) Rate Code 2=Daily Rate

(1) $\text{Rate} \times \text{Days} = \text{Total Amount}$

(b) Rate Code 0=Monthly Rate

(1) $\text{The fraction, } .03333334 \times \text{Days} + \text{Months} \times \text{Rate} = \text{Total Amount}$

This operation is performed at the rate of 100 cards per minute. Exhibit No. 2 shows detail cards before and after the gang-punch and extension operation. Exhibit No. 3 is the planning chart and wiring diagram for this operation.

Upon completion of the gang-punch and extension operation, the cards are tabulated through the Type 402 Tabulator, to zero-balance the individual MPR's. This is accomplished by adding the individual MPR's. This is accomplished by adding the individual credits and subtracting the individual debits. Simultaneously with this operation, control totals are accumulated of the monetary value of each block to be used for balancing factor in succeeding steps. The detail cards for the MPR's out of balance are listed on the Type 402 and checked to the MPR's with corrective action taken to balance the Military Pay Record. Field Finance Officers are notified of the errors and advised of corrective action to be taken. Exhibit No. 4 is a zero-balance tabulation and a listing of the amounts "out-of-balance."

When a group of blocks are "in balance," the detail cards are sorted by the account code and pay group. An "Account Code," is a code established to identify various types of pay earned or various types of collections made on the MPR and the year for which earned or collected. The Pay Group is composed of three significant digits—the first indicates the Department, such as Air Force; the second indicates grade or rank; the third indicates project, such as enlisted or officers. They are then tabulated and a summary card punched reflecting the account code, project, grade, amount and number of personnel. These summary cards are then used to prepare the Accounting List and Work Sheet from which a daily adjustment voucher is prepared. Through this daily adjustment voucher, the proper charges and collections are reflected to the appropriations concerning the pay of Air Force military personnel. Exhibit No. 5 is a Daily Adjustment Voucher.

On a monthly basis, the summary cards that are prepared daily, are used in preparing Pay Analysis Reports for Headquarters USAF for statistical and budget purposes. Exhibit No. 6 is a sample of the Pay Analysis Report.

the Punched
Card

Exhibit 1

[illegible]

EXHIBIT NO. 3

FORM 22-2122-1
PRINTED IN U.S.A.

TYPE 604 - PLANNING CHART

APPLICATION

PROBLEM

PROGRAM NUMBER	OPERATION NOTES	PROGRAM SUPPRESS	FACTOR STORAGE ASSIGNMENT				MULTI QUOT	COUNTER	GENERAL STORAGE ASSIGNMENT				PROGRAM NUMBER
			1	2	3	4			1	2	3	4	
8	READ		33	33	34		Rate		Days				8
1		Calc. No. 1 NX						RI Mult +	RO				1
2		X						RI Mult +					2
3	Read units out of 6th	X			Read In			Read Out Re-Set					3
4		X					RI		RO				4
5		X			RO			RI Mult +					5
6	1/2 Adjust 4th	X						Read Out +5 Re-Set					6
7	Read units out of 5th	X			Read In								7
8		X					RI					RO	8
9		X						RI Mult +			RO		9
10		X			Read Out			RI +					10
11													11
12													12

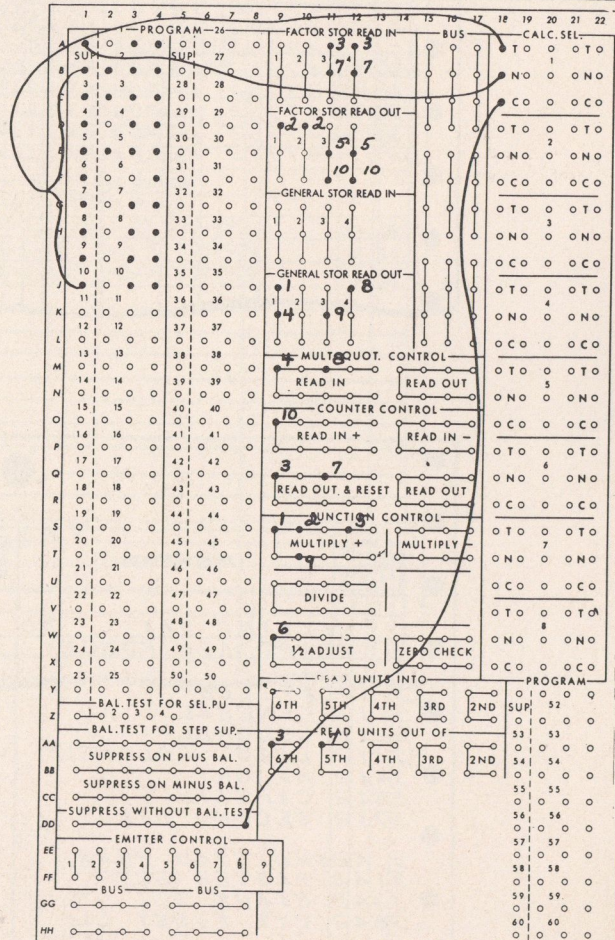
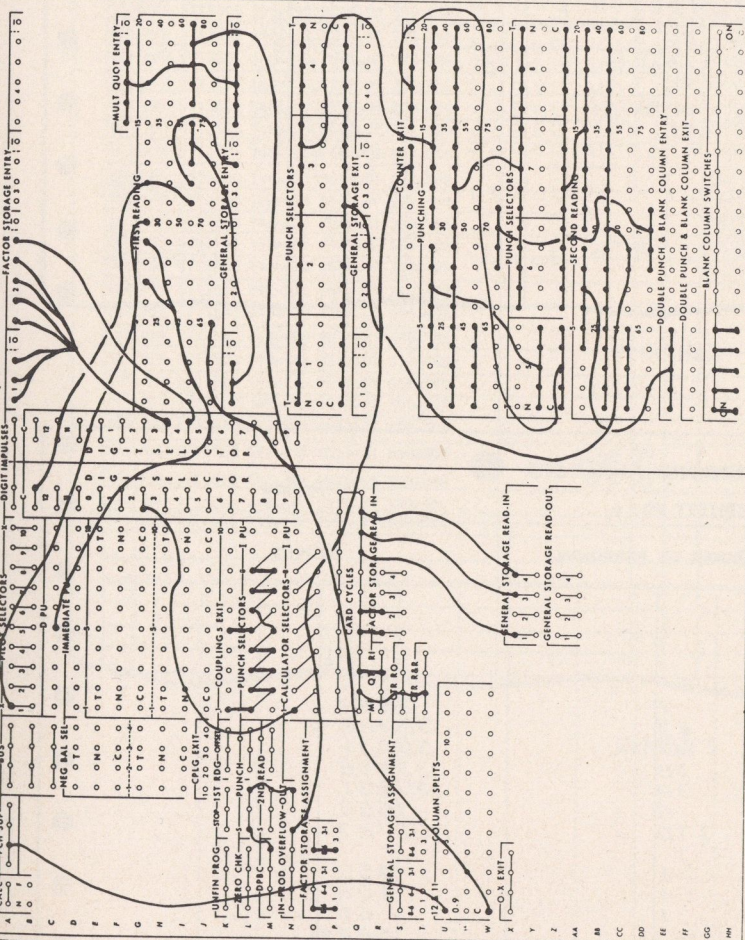


Exhibit 3

EXHIBIT NO. 4 ZERO BALANCE REGISTER													
ACCT. PD.		BLOCK NO.	DOC. NO.	PREFIX	SERVICE NUMBER	PAYMENT		SERVICEMAN'S NAME	YRS. OF SV.	ACCOUNT CODE	AMOUNT	REMARKS	
TYPE	DAY					APPR.	PROJ.						
899899	94	774	9	14	055828344			MCDONIEL O	B09051		174690	49*216*412	
899899	94	774	9	14	055828344			MCDANIEL J	B09299		70	49	
899899	94	774	9	14	055828344			MCDANIEL J	B09299		88200	49	
899899	94	774	9	14	055828344			MCDANIEL J	B09269		3060	49	
899899	94	774	9	14	055828344			MCDANIEL J	B09268		40500	49	
899899	94	774	9	14	055828344			MCDANIEL J	B09290		997	49	
899899	94	774	9	14	055828344			MCDANIEL J	B09290		2123	49	
899899	94	774	9	14	055828344			MCDANIEL J	B09285		840	49	
899899	94	774	9	14	055828344			MCDANIEL J	B09261		16200	49	
899899	94	774	9	14	055828344			MCDANIEL J	B09261		15000	49	
899899	94	774	9	14	055828344			MCDANIEL J	B09263		6370	49	
899899	94	774	9	14	055828344			MCDANIEL J	B09264		910	49	
899899	94	774	9	14	055828344			MCDANIEL J	B09265		426	49	
899899	94	774	9	14	055828344			MCDANIEL J	B09N19		28400CR	49	
899899	94	774	9	14	055828344			MCDANIEL J	B09819		76500CR	49	
899899	94	774	9	14	055828344			MCDANIEL J	B09021		7020CR	49	
899899	94	774	9	14	055828344			MCDANIEL J	B09007		300CR	49	
899899	94	774	9	14	055828344			MCDANIEL J	B09026		88030CR	49	
											6		
899899	94	775	2	12	201333344			WEST WILSON	04051		161734	52	
899899	94	775	2	12	201333344			WEST WILSON	04299		9163	52	
899899	94	775	2	12	201333344			WEST WILSON	04299		9996	52	
899899	94	775	2	12	201333344			WEST WILSON	04268		31725	52	
899899	94	775	2	12	201333344			WEST WILSON	04268		4950	52	
899899	94	775	2	12	201333344			WEST WILSON	04299		2744	52	
899899	94	775	2	12	201333344			WEST WILSON	04299		47	52	
899899	94	775	2	12	201333344			WEST WILSON	04269		2907	52	
899899	94	775	2	12	201333344			WEST WILSON	04268		1200	52	
899899	94	775	2	12	201333344			WEST WILSON	04265		12915	52	
899899	94	775	2	12	201333344			WEST WILSON	04021		2010CR	52	
899899	94	775	2	12	201333344			WEST WILSON	04008		279CR	52	
899899	94	775	2	12	201333344			WEST WILSON	04265		12810	52	
899899	94	775	2	12	201333344			WEST WILSON	04N19		760CR	52	
899899	94	775	2	12	201333344			WEST WILSON	04G19		8500CR	52	
899899	94	775	2	12	201333344			WEST WILSON	04G19		63750CR	52	
899899	94	775	2	12	201333344			WEST WILSON	04026		86435CR	52	
899899	94	775	2	12	201333344			WEST WILSON	04264		2030	52	
899899	94	775	2	12	201333344			WEST WILSON	04177		1463	52	
899899	94	775	2	12	201333344			WEST WILSON	04263		12789	52	
899899	94	775	2	12	201333344			WEST WILSON	04299		48951	52	
899899	94	775	2	12	201333344			WEST WILSON	04265		5400	52	
899899	94	775	2	12	201333344			WEST WILSON	04299		2646	52	
											2		
	2	41			336424			174465	336424			152350	
									336432			1009280	

Exhibit 4

PAY RECORD ANALYSIS EXHIBIT NO. 6										PERIOD	
PAY OP.		DESCRIPTION	YRS. OF SV.	NUMBER OF PERSONNEL			AMOUNT				
APPR.	GRADE			PROJ.	YRS.	SV.					
		2 FLYING PAY	56								
		2 DEPT AIR FORCE								*	
3	12	OFFICER									
3	12	GENERAL		7						7649	
3	12	COLONEL		43						52322	
3	12	LIEUT COLONEL		37						39031	
3	12	MAJOR		38						33138	
3	12	CAPTAIN		39						25981	
3	12	SECOND LIEUT		6						3600	
				170						161723*	
3	42	ENLISTED PERS									
3	42	MASTER SGT		1						450	
3	42	STAFF SGT		1						108	
3	42	PVT FIRST CL		1						66	
				3						624*	
						173					162347*

Exhibit 6

EXHIBIT NO. 5

SCHEDULE OF ADJUSTMENTS

D.O. VOUCHER NO.

COLLECTION VOUCHER NO.

MILITARY PAY DIVISION
AIR FORCE FINANCE CENTER
DENVER, COLORADO

ACCOUNTING DATE

Regular 2-14

DISBURSEMENTS

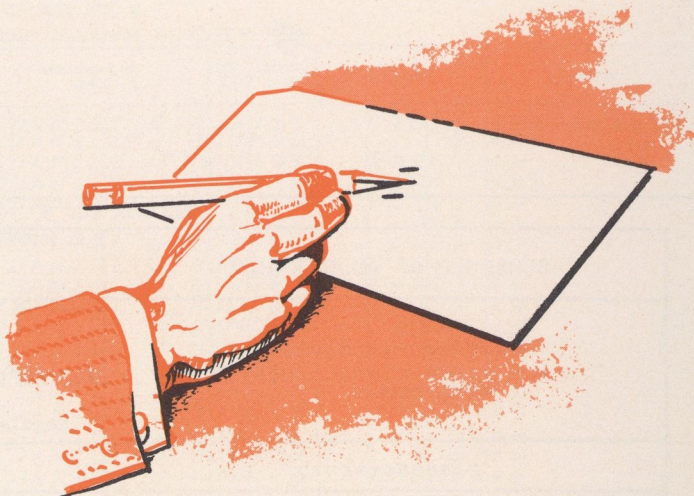
COLLECTIONS

APPROPRIATION, ALLOTMENT, PURPOSE, STATION	AMOUNT	APPROPRIATION, ALLOTMENT, PURPOSE, STATION	AMOUNT
153 MPR 5713500 148-110 P514-01 S99-999	1422 75	001 FSA 5703500 060-140 P514-01 S99-999	895 86
155 MPR 5713500 148-104 P511-01 S99-999		011 FSA 2100425 1-140 P404-01 S99-999	
156 MPR 5713500 148-102 P511-01 S99-999	1185 33	101 MPR 5713500 148-401 P514-01 S99-999	10459 29
156 MPR 5713500 148-202 P512-01 S99-999		102 M & O 5713400 243-C-405 438-99 S99-999	23 58
156 MPR 5713500 148-402 P514-01 S99-999	495 00	103 MPR 5713500 248-C-405 530-99 S99-999	381 22
157 MPR 5713500 148-103 P511-01 S99-999		105 MPR 5713500 248-C-405 593-99 S99-999	
157 MPR 5713500 148-203 P512-01 S99-999		006 REP. LAP APPRO. 573590	401 41
157 MPR 5713500 148-303 P513-01 S99-999		007 LDCO 572530	5525 29
157 MPR 5713500 148-403 P514-01 S99-999		008 GPLD 573511	1148 46
158 MPR 5713500 148-108 P511-01 S99-999		111 FSA 2110425 1-140 P404-01 S99-999	
158 MPR 5713500 148-208 P512-01 S99-999		021 W/TAX 57F0101	173880 82
158 MPR 5713500 148-308 P513-01 S99-999		023 USSH 578930.6	1094 10
158 MPR 5713500 148-408 P514-01 S99-999		031 CMF-RP 578930.1	1775 14
160 MPR 5713500 148-113 P511-01 S99-999		032 CMF D/D 578930.2	
160 MPR 5713500 148-213 P512-01 S99-999		033 CMF DES. 578930.3	
160 MPR 5713500 148-313 P513-01 S99-999		035 PENIAM 57x6031 242-C-997 P997-99 S99-999	
161 MPR 5713500 148-413 P514-01 S99-999	83 12	202 M & O 5723400 243-C-405 438-99 S99-999	119 59
161 MPR 5713500 148-513 P515-01 S99-999		203 MPR 5723500 248-C-405 530-99 S99-999	968 44
162 MPR 5713500 148-417 P514-01 S99-999	180 00	205 MPR 5723500 248-C-405 593-99 S99-999	467 61
163 MPR 5713500 148-123 P511-01 S99-999		101 MPR 5713500 148-101 P511-01 S99-999	267 64
163 MPR 5713500 148-223 P512-01 S99-999		MPR 5713500 148-201 P512-01 S99-999	
163 MPR 5713500 148-323 P513-01 S99-999		MPR 5713500 148-301 P513-01 S99-999	
163 MPR 5713500 148-423 P514-01 S99-999		MPR 5713500 148-501 P515-01 S99-999	
163 MPR 5713500 148-523 P515-01 S99-999		5703500 060-110 P511-01 S99-999	33 48
165 MPR 5713500 148-401 P534-02 S99-999	157 80	5703400 260-C-405 442-99 S99-999	438 35
166 MPR 5713500 148-120 P511-01 S99-999		5703500 260-C-405 530-99 S99-999	7 08
166 MPR 5713500 148-220 P512-01 S99-999			
166 MPR 5713500 148-320 P513-01 S99-999			
166 MPR 5713500 148-420 P514-01 S99-999			
167 MPR 5713500 148-119 P511-01 S99-999			
168 MPR 5713500 148-112 P511-01 S99-999	396 25		
168 MPR 5713500 148-212 P512-01 S99-999			
168 MPR 5713500 148-312 P513-01 S99-999			
168 MPR 5713500 148-412 P514-01 S99-999	4468 37		
169 MPR 5713500 148-414 P514-01 S99-999	602 25		
169 MPR 5713500 148-514 P515-01 S99-999			
175 MPR 5713500 148-132 P594-11 S99-999			

S A M P L E

Exhibit 5

Mark Sense Payroll



PERSONNEL DEPARTMENT maintains blank printed Home Department Job cards which have been gang-punched with X-62 and card code 5. New employees are given clock cards and one Home Department card upon which appears the new employee's name, department, shift if any, employee number, and week ending. The new employee will give the Home Department card to the timekeeper who keeps his time. The timekeeper will treat it as a regular Home Department card, recording the time for the first job worked on it and filing all subsequent pink striped cards behind it.

Timekeepers have pink striped cards available to avoid the error of their running out the correct job cards, and borrowing the wrong kind. These must have card code 6, department, and shift, if any.

The Master name card files may be changed for tax class, shift, and base rate as soon as notice is received—or as soon as the change is to become effective in order that the new job cards going out into the mill will always be up to date. The year-to-date cards are not to be changed for department, shift, and Tax class until after the current payroll is run, but certainly before the next payroll, in order to agree with the job cards sent out based on the Master Card reproduction.

When notification of a new employee is received in IBM, a master name card is made up as well as a dummy year-to-date card to be filed in the last week's year-to-date file to await collating against the current week's earnings summary card. If the employee has previously worked, the old year-to-date card is pulled from the inactive file, checked for proper quarterly earnings figure (left out if worked in previous quarter), department, shift, tax class, etc.

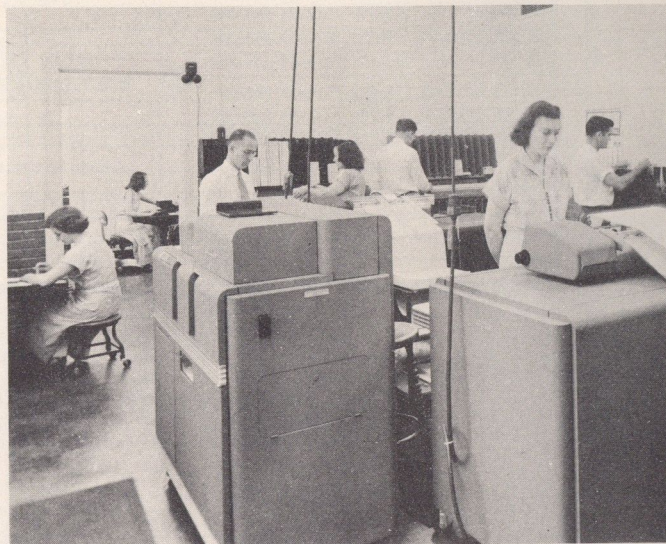
Each Friday afternoon prior to the end of the working day, home department cards are reproduced from the current Master name card file, interpreted for name, department, shift, employee number and week ending, and sent to the respective departments.

The following is Bleachery Division Procedure only: All departments turn in their job cards as soon after the week ending as possible. Each timekeeper must have his or her cards in

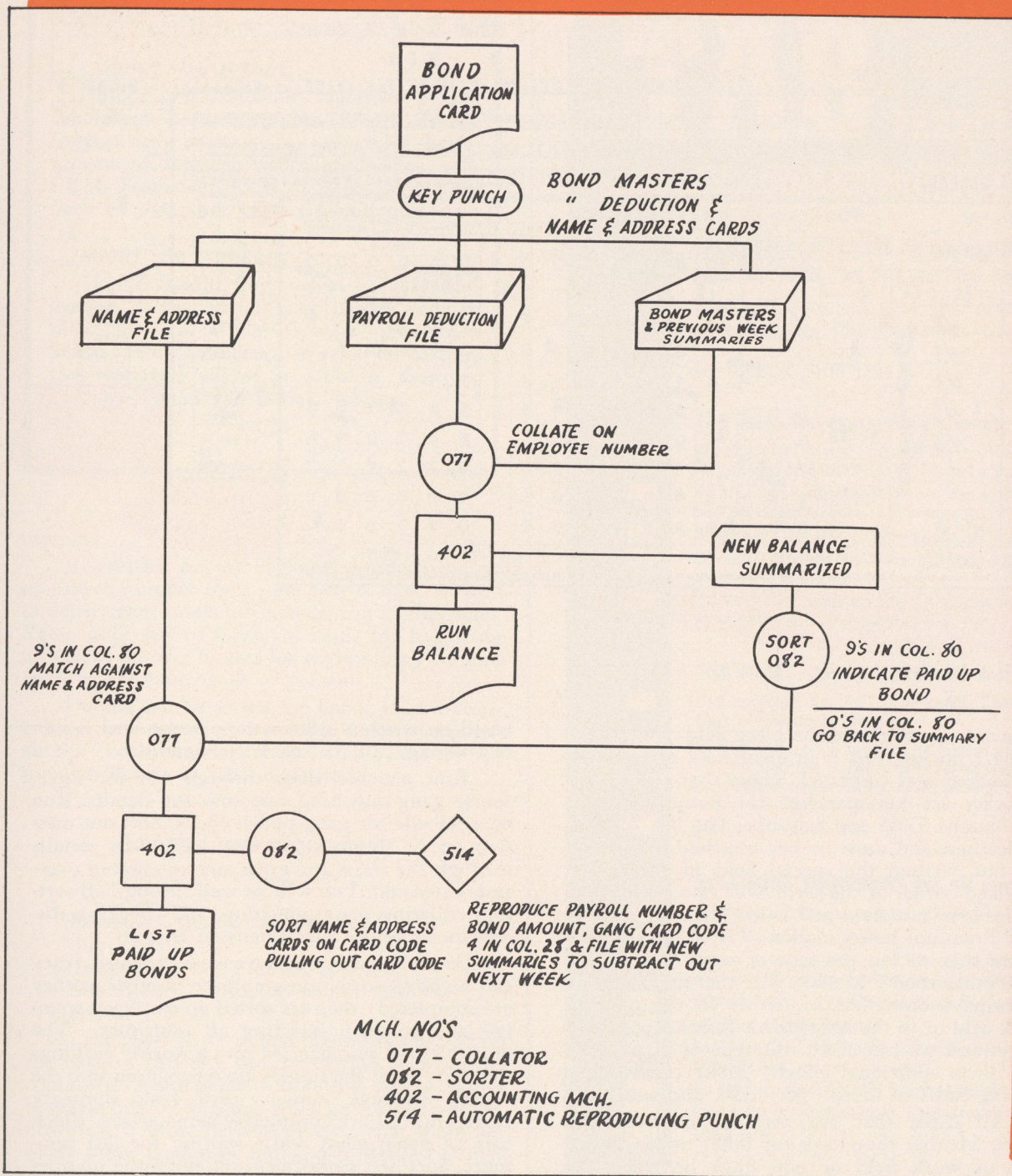
home department—Pink Striped card order for each employee and marked to the best of their ability.

When they are received in the IBM department, they are immediately visually checked to determine that the cards are arranged in the above order, and to remove all cards for new employees as indicated by the type in name, etc., on the home department card. The punching in the home department card is completed at once, based on correct information available in the Master name card or employment slip. As soon as cards have been checked, they can be sensed and intersperse gang-punched and gang-punched checked. All errors of any sort discovered by the 514 are corrected. When any one card is held out for correction, all cards for that employee are held out until correction is made, then run back through for a check.

When all cards have been corrected, mark-sensed, etc., they are sorted on Column 1. Since this is the Bleachery, it isn't necessary to take all those that fall in the pocket and fan to see if



Tabulating Dept. Riegel Textile Corp.
E. M. Callaham, Manager



Government Bonds

When bond application card comes from bond clerk, punch bond deduction card for payroll, bond master, and name and address cards.

After payroll has been run and balanced, pull collected bond cards and merge with bond masters and previous week summaries. Run report, summarizing new balance cards.

Sort 9's in column 80, and match against name and address files. List bonds to be issued. After listing, sort on card code and reproduce employee number and amount of bond, gang card code 3 in column 28. These cards are filed with new summaries so that they will subtract out next week.

50 | 1850SMITH TRUMAN A | 00229507 | 323 | 009204100950

DEDUCTION CARD - WHITE - UL *Sample*

DEPT. 2 S EMP. NO. 8 EMPLOYEE NAME 26 SOCIAL SECURITY NO. 35 EARNINGS YEAR-YR-DAY WEEK ENDING 70 71 72 73 74 75 76 77 78 79 80

DEPT. 2 S EMP. NO. 8 EMPLOYEE NAME 26 GROSS AMT. BEFORE O.T. 31 PREMIUM AMOUNT 35 GROSS AMT. AFTER TAXES 40 OAS 43 W. TAX 47 NET AMOUNT AFTER TAXES 40 QTD. YTD 48 49 WEEK ENDING 70 71 72 73 74 75 76 77 78 79 80

1 YEAR-TO-DATE SUMMARY CARDS - MANILA - S BROWN STRIPE TOP - UR 2 WEEKLY EARNINGS - MANILA - UL

JOHN W POORE 000 50 1876 2 2731 002150 12081

DATE	HOURS	PIECES	BONUS	PLANT ACCOUNT	A	B	SPECIAL	DOUBLE TIME	PREMIUM HOURS
MON.	8	43							
TUES.	8	43							
WED.	8	43							
THUR.	8	43							
FRI.	8	43							
SAT.									
SUN.									
TOTAL HOURS	40	215							

DO NOT FOLD, BEND OR TEAR THIS CARD

IBM 785877

there are any marks in the piece field. If any fall in the 1 pocket, this is in error here and should be checked and corrected. Those that fall in the 2 pocket are key punched for Bonus Amount in Columns 63-66 and held out. The No. 6 cards are learners and must be key punched for Learner's rate written the special field in the upper left hand corner of the card. This rate is punched in the base rate field and held. The No. 9 cards have Premium hours marked. (It is a good idea before this, to fan the type of work field in all cards other than 9 to make sure that no Premium hours have been marked, either in the type of work field or in the hours field. Timekeepers will forget and we can catch this type of error with very little additional effort.) Make corrections; put the cards in the proper decks, and continue.

All cards that are marked for Premium hours, whether they have any other marks in the type of work field or not, must be run back through the 514 for double punch blank column detection.

When the Premium hour cards have been mark-sensed, they are sorted on Type of Work again locking out the 9's, completing the punching, if any 2's or 6's drop out. It may be advantageous to lock out all 9's on the first sort complete all punching, then sort for 9's of the 2, 6 group. All cards have been mark-sensed and punched with exception data.

Sort on job number, then collate against the job number rate deck, selecting all unmatched masters and details. All unmatched details indicate that the man has been marked wrong. If the card has just been marked wrong, cards are corrected

based on written information; if the card is jobbed wrong, call for correct job number.

Run matched deck through 514 for inter-spense gang-punching rate into the details. Run on read side for gang-punch check. Sort out masters on X 17, lock out rest, and start details through the 602A for gross amount before overtime extension. You will be well through all sorting, collating, gang-punching, and checking discrepancies before that extension is over.

As soon as all cards have been extended (they can be block-sorted on employee number as they are completed) they are sorted on employee number and collated, selecting all multiples. The multiples are summarized into a weekly earnings summary card; the singles are reproduced into the weekly earnings summary card. Hold summary cards until all are completely summarized. Block sort on department while waiting for last summary. Sort first department on employee number and run through 602A for the new amount after taxes extension. In the meantime, sort remaining departments by blocks on employee number.

The previous year-to-date summaries can be collated against the deduction file in department employee number order to be ready for the first cards through Net after Taxes, extension. The weekly earnings are collated, matched, merged, and selected unmatched masters and details. (There should not be any unmatched details if the year-to-date file has been maintained properly.)

Matched cards are listed for the Payroll Checks. (Check all complements, etc., and balance each department before releasing. Totals will crossfoot on new procedure since deductions are

... about the author

Mr. E. M. Callaham, supervisor of the tabulating department for Riegel Textile Corporation, possesses an extensive background of fourteen years' experience with I.B.M. Equipment. Ten of these years have been as supervisor of this installation.

... about the company

Riegel Textile Corporation is one of the leading textile corporations in the country with plants at Trion, Georgia and Ware Shoals, South Carolina. In addition to this, they maintain offices in Atlanta, Georgia, Chicago, Illinois and Dallas, Texas.

carried).

Re-run for payroll register, summarizing on employee number for a new year-to-date, as well as department totals for later listing of the recap. Retab both sets of summary cards for balancing as well as posting figures for withholding tax and year-to-date controls as at present.

Details can be sorted for Labor Distribution as soon as summaries have been balanced against details (both singles and multiples) and tabbed for distribution by Mill if desired.

Punch-Operators Test

Continued from page 52

Repeat—A number repeated or a card duplicated.

Transposition—54 for 45, 27 for 72.

Miscellaneous—Any errors not classified above.

On the basis of 22 punch operators selected on the basis of this test, the correlation between the composite score percentile rating and a rating based on quality of actual work performed was .90, however, it must be remembered that there are many other factors in addition to natural ability which might affect the quality of work actually performed. Therefore, the correlation of .90 must not be taken too literally in consideration of the other factors, and is given only for the purpose of indicating very roughly the merits of this test when used as the basis for selecting punch operators.

Even though the test was designed for the purpose of testing new applicants, it can be useful as a means of determining improvement in the ability of a punch operator or as a means of comparison among skilled operators.

The author, Mr. E. T. Jolliffe, is manager of the Statistical Service Bureau of the State University of Iowa at Iowa City, Iowa.

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- 20 drawer steel file . . . general use and storage.
- 27 drawer economy file . . . card storage and semi-active use.
- 2 drawer desk reference size . . . can be combined to make either 4, 6, or 8 drawer units.

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- New horizontal tub file . . . removable Fiberglas trays . . . automatic indexing.
- New vertical tub file designed for faster card handling. Both models equipped with adjustable feet, light Fiberglas covers, Fiberglas posting board. Several sizes.
- Standard steel tub files.

ACCESSORY EQUIPMENT for all purposes

- Card punch desks . . . steel . . . 2 models.
- Table-Top Truck . . . steel.
- Control panel cabinets . . . 2 flexible models. Either channel type or flat shelf for all board sizes.
- Posture chairs . . . for the card punch operator.
- Vibration control mounts.
- Card racks . . . mobile and stationary; various sizes, models.
- Binders . . . all styles: for binding tabulating reports.
- Card trays . . . various sizes. Card weights.
- Index cards.
- *T.M.

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22 BATTERY ST., SAN FRANCISCO 11, CALIFORNIA



punched Cards

INVADE THE HOME

Mark-Sense Meter Reading Cards Simplify Billing

PHILADELPHIA Gas Works Company recently completed the conversion of 567,000 meters from manual meter book reading to mark sense reading on pre-punched cards. This company is the first large Eastern Utility to adopt this type of meter reading.

The prepunched card used by the meter readers contains all the information necessary for him to complete his function adequately and efficiently, such as Meter Number, Customer's Name and Address, previous month's reading, and a complete coding of unusual circumstances he may encounter, such as bad stairs, low ceilings, bad dog, and so forth.

Accounts Receivable Mechanized

The recording of the meter reading in this manner has made it possible to completely mechanize the entire Billing and Accounts Receivable functions from the time the cards are returned to the company until the final descriptive bill is ready to be delivered to the customer.

Meters are read and customers are billed on a cycle basis, at the rate of approximately 30,000 accounts per day. The meter reader marks either three, four, or five columns, in accordance with the number of dials on the meter. Bad marking, as detected by double punch or blank column, has consistently run less than 2%, and this was made possible by a very thorough and compre-

hensive training program for the 120 meter readers. Extreme weather conditions have had only a minor effect on tabulating operations.

Billing and Receivable Cards

The Advanced Billing and Meter Reading Card is one of only two documents, both punched cards, that are maintained for the entire customer accounting system. This card, which is created automatically from the previous month's card, has the following uses:

- Records the meter reading by Mark Sensing.

- Insures that every meter has been read by automatically comparing it with the customers History Card.

- Computes the gas consumption and extends the billing amount through the medium of IBM 604 Calculators.

- Provides Revenue and Consumption Statistics.

- Writes the Monthly Bill in association with the History Card.

- Is the Accounts Receivable Record.

- Records the Cash Received when the item is paid.

- Becomes the Record of Arrears when unpaid.

- Provides the detail of an arrears condition in the Billing operation.

- As an Arrears Record, it is also used to write Collection Notices.

Customer Record Maintained

The only other accounting record maintained is the prepunched Customer History Card. This card identifies each Gas Meter to a customer and reflects the entire history of the account as to consumption and billings. This information is machine posted to the card by a comparing bill feed on an IBM model 416 Tabulator. The History Card is used to write Bills and Collection Notices in conjunction with the Advanced Billing Card. It is also used in an application unique in the Gas Industry, that of determining by machine when a meter should be changed, and making possible the automatic preparation of Meter Change Notices.

The many uses of the aforementioned punched card accounting record is evidence of the complete mechanization that has been attained; and because practically every step in the procedure is a machine operation, it also serves as a brief, but clear, summary of the operations of this installation.

Mechanical Calculations Speed Billing

The calculation of the gas consumption and the amount to be billed to each customer is accomplished on the 604 Calculator, which completes all necessary calculations and the checking of these calculations in two runs of 60 programs each. Some of the factors included in this calculation are the application of a step rate to the usage (to include punching of step at which billing is completed), correction for multiple month billing, proper calculation of master billing, and a comparison of present usage against previous to determine correctness of reading within acceptable limits. These combined operations formerly required about 10 man days of clerical effort daily.

After the calculations have been completed, the Advanced Billing cards are merged with the History Cards and any previous arrears items, represented by cards that have not been pulled from the Accounts Receivable files. These combined cards are used to prepare continuous form paper bills, showing the complete status of each account. These bills, in their continuous form, are taken to an automatic bursting and imprinting machine, which separates them and simultaneously prints the Gas Rate Tables on the reverse side, at the rate of 12,000 per hour. They then pass through an automatic folding machine, and from there to an automatic stuffing machine, which inserts them in envelopes along with any sales promotional material the company wishes to send to its customers. This completes the entirely mechanized cycle of meter reading and billing, which started with marking prepunched cards on the premises of the customer and ends with the insertion of the completed bill in envelopes, ready to be delivered.

—National Tabulating
Management Society, "Punch"

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Machine Accounting *simplifies* Personnel Records

MANAGEMENT is well aware of the headaches involved in compiling the information required to comply with the Wage Stabilization regulations. Mechanization of personnel records proved to be the ready solution to many problems presented by wage stabilization, merely as a by-product of the basic personnel data maintained for other purposes.

Complete Personnel Data Punched

Very little creative power is required to visualize the possibilities of a punched card containing the following information for each individual having employment relationship in a company: Name; sex; location; organization; classification; company seniority; pay seniority; longevity status; hourly rate; monthly rate; effective date of rate; preparation date of rate authorization; employee identification number; birth date; date and amount of second prior increase; date and amount of first prior increase; regular employment full or part time; temporary employment full or part time; separations classified as follows: normal, termination of lay-off, termination of leave of absence, termination of military leave, resigned, released, reduction in force, retired, deceased, and termination of temporary or part time temporary employment; pay changes due to union agreements, salary schedules, wage reviews, and other; transfer; reclassification; change in name; and correction to prior authorization.

How is it possible to maintain the information outlined above in an 80-column card? How can such information be maintained currently? The answers to these very logical questions are obvious if we study the personnel record card and "Notice of Employee Status" form which is part of this article.

It may be interesting to note what Mr. K. E. Richards, a representative of our Personnel and Wage & Salary Administration, has to say about this subject. We have his permission to quote his letter, addressed to the writer:

"In the article that you have been asked to write concerning the use of machine records, you can feel free to quote me to the effect that we do not believe we could operate our personnel record system in United Air Lines without machine accounting.

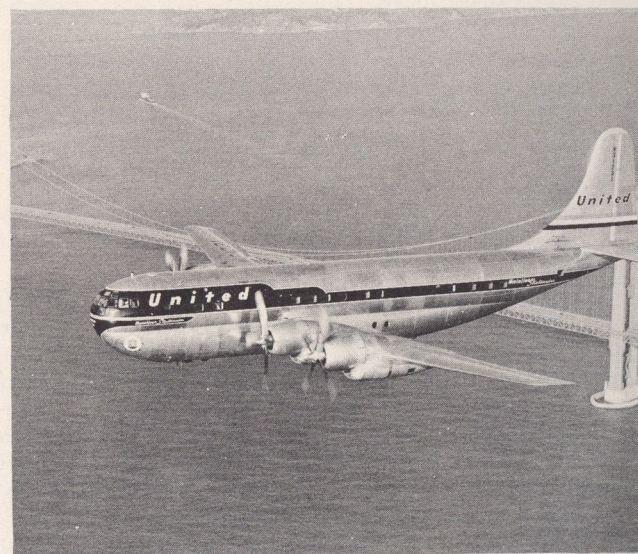
"We receive monthly listing of new employees in alphabetical order, organization element order, and in job title order. All of these runs fill specific needs — the alphabetical to provide a reference guide on a month to month basis to new employees; the organization run to show us which parts of the organization are hiring new



... about the author

Mr. John C. McAbee possesses a background of 25 years in the transportation field, nine of which have been spent with his present employer, United Air Lines, Inc. As part of this background he has been closely associated with machine accounting for the past 17 years. In addition to his machine accounting knowledge, his college education includes Liberal Arts and Business Management. As machine accounting manager, he has the administrative responsibility for over 10,000 points of IBM equipment, located in the executive offices at Chicago. He has the functional control of 6,000 points at United's San Francisco office, and a smaller unit of 1500 points at Denver, Colorado.

The machine applications supervised by Mr. McAbee are extensive and diversified. The inventory control involves some 53,000 stock items and the revenue accounting has been mechanized to the extent of approximately 8,000 cards per month. They are making tremendous strides in the use of electronic equipment, particularly on payroll and revenue accounting.



... about the company

United Air Lines is the nation's oldest scheduled airline. Its 13,250-mile system extends cross-country from the Atlantic Seaboard to the Pacific, blankets the West Coast from San Diego to Vancouver, B. C., and continues overseas to Hawaii.

United serves 83 cities, flying approximately 200,000 miles daily. The company has 12,000 employees, including more than 800 stewardesses and 1,000 pilots. Its fleet of Mainliners consists of 51 DC-3's; 11 DC-4 coaches; 43 DC-6's; 12 DC-6B's, with 9 additional on order; 6 Stratocruisers; and, as of this summer, new Convair-340's, of which 40 are on order. There also are 12 all-cargo carrying DC-4 Cargoliners.

United is headed by W. A. Patterson, who became president in 1934. The company's executive offices are in Chicago, the Operating Base in Denver and the Maintenance Base in San Francisco. To link these points with other cities on its system, United has 13,000 miles of private telephone lines and 20,000 miles of teletype circuits.

employees; and the job title listing to enable us to check the starting salaries of new employees to see how many are being hired at the minimum published rates and how many are given credit for previous experience and are being hired above the minimum rates. We receive monthly listings of separated employees. From these listings home address plates are removed from the files and turnover reports are computed.

"We also receive job title listings of all active employees of the company whereby all employees are listed by job classification. This listing enables us to analyze the rate ranges in each job classification and to compute average rates of pay by classification.

"We also receive company seniority listings at regular intervals to enable us to anticipate service pin needs and to estimate vacation costs (because employees with different amounts of company service are entitled to different amounts of vacations).

"All of these particular listings have been made possible because our basic personnel record of each individual employee in the company has been punched into cards and this information is maintained on a current basis in the following manner:

"The form titled 'Notice of Employee Status', Form UG-100, contains all of the pertinent information about the employee's present status

UNITED AIR LINES										NOTICE OF EMPLOYEE STATUS										SEE REGULATIONS - SERIES 15.													
EMPLOYEE'S NAME										LOCATION		ORGAN		JOB		CO. SENIORITY		PAY SENIORITY		HOURLY		MONTHLY		EFF. DATE		PREP. DATE							
										CITY		CODE NO.		CODE NO.		MO. DAY YR.		MO. DAY YR.		RATE		RATE		MO. DAY YR.		MO. DAY YR.							
PRESENT STATUS																																	
BY THIS ACTION																																	
LAST FIRST INITIAL																																	
NOTE: - ENTER CHANGES IN STATUS ON "BY THIS ACTION" LINE. CHECK APPROPRIATE BOX(ES). COMPLETE BLANKS IN APPROPRIATE SECTION(S).										FILE NO.		BIRTH DATE		INCREASE CODE		ACTION CODE																	
										MO. DAY YR.		MO. DAY YR.		2ND PRIOR		1ST PRIOR		CHANGE		M		STATUS											
SECTION A (ENTER LENGTH OF PROBATIONARY PERIOD ON 3RD & 4TH COPIES)										ACCOUNT NO.		SOC. SEC. NO.		BIRTH DATE																			
EMPLOYMENT										LOCATION		ORG. ELEMENT		JOB TITLE		REQUISITION NO.		DATE RATE APP'D BY D.P.M.															
1 EMP. REGULAR (1) FULL TIME																																	
2 EMP. TEMPORARY PART TIME																																	
3 RE-EMP. REGULAR (1)																																	
4 RE-EMP. TEMPORARY																																	
SECTION B (REMOVE 4TH COPY BEFORE CHECKING BOX BELOW.)										VACATION PAY DUE		HRS. SHIFT OR DAYS		OTHER PAY DUE		FORWARDING ADDRESS		(REMOVE 4TH COPY BEFORE COMPLETING BOX BELOW)															
1 RESIGNED																																	
2 RELEASED																																	
3 REDUC. IN FORCE																																	
4 RETIRED																																	
5 DECEASED																																	
6 TERM. OF TEMP. OR PART TIME TEMP. EMP.																																	
SECTION C										FORWARDING ADDRESS		VACATION PAY DUE		HRS. OR DAYS		APPROVED LEAVE		DAYS															
1 LAY-OFF COMMENCEMENT (2)																																	
2 MILITARY LEAVE COMMENCEMENT (3)																																	
3 LEAVE OF ABSENCE COMMENCEMENT (4)																																	
SECTION D										SENIORITY DATES CONFIRMATION (CONSIDER NECESSARY ADJUSTMENTS RESULTING FROM THIS ACTION.)		COMPANY SEN.		PAY SEN.		LONGEVITY SEN.																	
1 TERM. OF LAY-OFF RETURN																																	
2 TERM. OF MILITARY LEAVE RETURN																																	
3 TERM. OF LEAVE OF ABSENCE RETURN																																	
4 CHANGE TEMPORARY TO REGULAR																																	
SECTION E										UNION AGR.		LONGEVITY SEN. DATE		SALARY SCHEDULE		WAGE REVIEW		APPROVED BY DIST. PERSONNEL MGR. ON DATE															
1 PAY CHANGES																																	
SECTION F										SUCCESSFUL BID		NEW ACCOUNT NO.		NEW ORG. EL.		NEW JOB TITLE																	
1 TRANSFER																																	
2 RECLASSIFICATION																																	
3 CHANGE IN JOB TITLE																																	
SECTION G										CHANGE IN NAME (FULL NAME OF SPOUSE)																							
1 CORRECTING THE UG-100 PREPARED ON DATE																																	
2 SEE REMARKS										ORIGINATOR		APPROVAL		DATE																			
UG 100 REV. 1-51 PRINTED IN U.S.A.																																	

ORIGINATING SUPERVISOR'S COPY

3

UNITED AIR LINES										NOTICE OF EMPLOYEE STATUS										SEE REGULATIONS - SERIES 15.													
EMPLOYEE'S NAME										LOCATION		ORGAN		JOB		CO. SENIORITY		PAY SENIORITY		HOURLY		MONTHLY		EFF. DATE		PREP. DATE							
										CITY		CODE NO.		CODE NO.		MO. DAY YR.		MO. DAY YR.		RATE		RATE		MO. DAY YR.		MO. DAY YR.							
PRESENT STATUS																																	
BY THIS ACTION																																	
LAST FIRST INITIAL																																	
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										MO. DAY YR.		MO. DAY YR.		2ND PRIOR		1ST PRIOR		CHANGE		M		STATUS											
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UG 100 REV. 1-51 PRINTED IN U.S.A.																																	

with the company and is used to report changes in the employee's status. Information on the card is printed on the UG-100 form and the supervisor maintains a set of these forms for each employee in his group. The set contains four copies and when the employee's status is changed, the supervisor takes the set out of his files that shows the employee's present status and makes corrections on the form in the spaces that are provided to reflect the employee's new status.

"The supervisor sends copies of this form with the changes noted thereon to the Payroll Department who audit the action and forward copies of the form to Personnel and Machine Accounting. Machine Accounting punches a new card and places it in the master personnel card record file and removes the obsolete card. Machine Accounting preheads another set of UG-100 forms and returns the set to the supervisor who files the forms until it is necessary for him to report another change of status for the individual.

Aids in Compliance with Wage Stabilization Regulations

"With this sort of a record system it was easy for us to do the work that was necessary to accomplish a general increase for employees and to keep that increase within the limitations of Wage Stabilization.

"First, we had to determine the increases that had been granted during the year 1950, to see the extent to which further increases could be made under Wage Stabilization. The punch cards were sorted by job classifications and the job classifications were put into the various job grades so that salary levels could be computed. Studies were then made to determine the extent of the increase in 1940 and to determine the extent to which further increases should be given.

"When the amounts of increases were determined for each salary level, Machine Accounting was able to mechanically compute the employee's new rate of pay and prepare a new personnel record card. In this instance, we decided not to require the supervisor to prepare the UG-100 manually and requested that Machine Accounting prepare all UG-100's reflecting the change in status by machine.

"This was done and the forms reflecting the general increase were sent to the supervisors throughout the system. They were mailed on a Friday evening and were received in 80 different locations, including Honolulu, on the following Monday morning. Instructions for their distribution to employees and the announcement of the increase were included with the forms. This was the only announcement that had been made about the increase and supervisors and employees were pleasantly surprised all over the company's system about this information. This could not have been accomplished without Machine Accounting within the time limit provided (16 hours).

Personnel Statistics By-products

"We use the machine records for many other purposes in addition to providing information for study purposes. For example, we reproduce at regular intervals pertinent information from

the basic personnel cards into especially designed cards that enable the employee to report his correct home address. The employee's name, job classification, organization, and other information, are interpreted across the top of this card and the cards are sent to supervisors. Each employee personally writes in his home address and marital status on the card. When the cards are returned, they are used to audit the company's home addressograph plates, and Machine Accounting then uses the cards for preparation of the W-2 earnings statements. We have tried several other systems but have found that this is the only way that we have been able to maintain correct home addresses for all employees, and this is important because a great deal of information is sent by this company to employees at their homes.

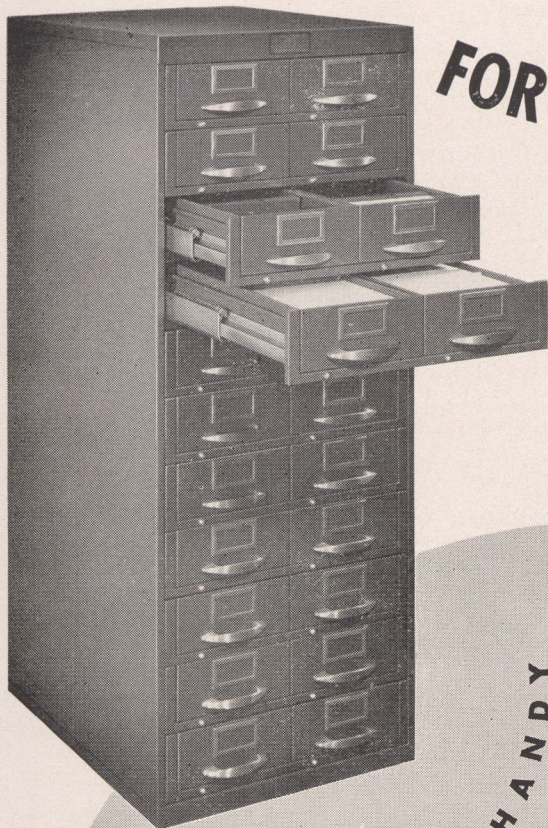
"We have also had military status cards reproduced from the basic personnel cards so that we can maintain up-to-date records for employees and thus do a better job of administering our personnel program during the time that military requirements face every company."

Mr. Richards has only mentioned a few of the purposes the personnel record card serves. The personnel record cards provide a medium through which Machine Accounting furnishes the Insurance Department with the necessary information to properly maintain up-to-date individual employee premium records within the various salary and job classification brackets. The cards are used to produce and maintain the Retirement Income Plan master card file; prepare Retirement Income Plan eligibility listings; compile statements showing employees eligible to purchase company stock and the amount of stock allotted based on seniority, salary, etc.

A combination of pertinent information contained in the personnel record cards with certain information contained in the payroll, insurance deduction, Retirement Income Plan, military status, and other master cards, provides tremendous possibilities for mechanically compiling information for Management. We could write a book describing the many interesting special statements which we have been able to prepare because we have up-to-date key punched cards containing the personnel record of individual employees.

We have attempted to explain how Machine Accounting can assist Management to comply with Wage Stabilization regulations, in addition to solving many other problems pertaining to wage negotiations, salary adjustments, etc. We also reproduce the Employee Vacation and Trip Pass Authorization cards from our personnel record cards (approximately 40,000 to 50,000) per annum.

Editor: United has mechanized their flight statistics through the use of punched card machine accounting equipment. These flight statistics are assembled and classified currently as the telemeters flow into a central point in Denver, Colorado. A record of each flight is established on punched cards.

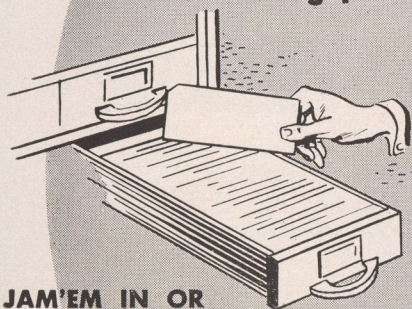


**FOR HASTE WITHOUT WASTE
USE**

Browne-Morse *Tabulating Card File*

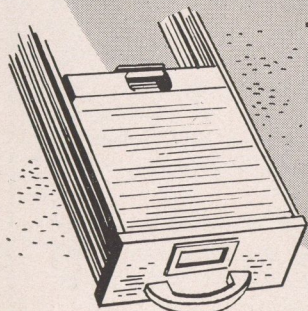
Tattered and torn tabulating cards cost you time and money. Wrinkles, rips, and indentations cause rejects each time such cards are run through your tabulating machine. The Browne-Morse File 2022W has been designed to give you speed and ease of handling while affording your file cards maximum protection from everyday wear.

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GRAB'EM OUT — THEY'RE SAFE!**

The generously rolled tray edge of each drawer cradles the file cards into place without the least opportunity for scarring or marking. Nicked edges and torn corner rejects are no more.



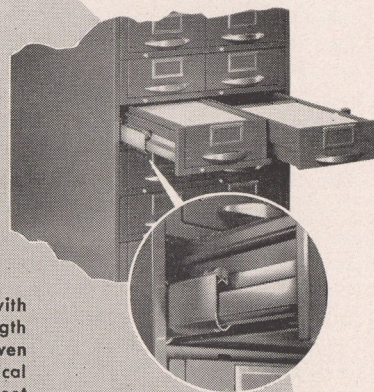
100% COMPRESSION

Moving from the rear of the file to within 1/4 inch of the front, the Browne-Morse friction type compressor unit will lock at any position to compress any number of cards firmly in place. A smooth-faced compressor panel eliminates indentations on your cards, reduces rejects.

PLENTY OF STRENGTH 90,000 CARD CAPACITY

Twenty-two separate file drawers each with a large rolled edge give much added strength to the unit. Additional reinforcement is given by 10 cross rails on the front panel, 3 vertical U-channels on each side, and a solid sheet metal top, bottom and back.

The exclusive Browne-Morse Glider Extension Arm gives "Feather Touch" action because of even load distribution on all points of the glider arm. Contour of the raceways exactly fit the contour of the balls in the extension arm, eliminating excessive wear and flat spots.



EASY TO HANDLE SPACE SAVING



To remove a drawer from the cabinet you merely pull out the Glider mounted tray and lift the drawer off. The tray then glides back into place. Individual drawers are interchangeable. An exclusive Browne-Morse feature allows each drawer to be slipped back into any opening while the tray is in closed position conserving much-needed aisle space and eliminating unnecessary handling of trays.

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MUSKEGON MICHIGAN

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I would like more information on Browne-Morse File 2022W.

NAME _____

POSITION _____

COMPANY _____

ADDRESS _____

Proper Name Codes

By Clifford L. Constance

IN THIS ARTICLE we discuss briefly the translation of personnel and academic data into numerical equivalents, by schemes which utilize the respective possibilities of identification and description. This discussion leads to the application of our new nine-thousand-division code for proper names. All of this is most important, of course, when related to the technique for using Tabulating punched-card equipment.

A person's name adequately identifies him only so long as no other person bearing the same name appears in the particular population; when a second "John Doe" appears he must be distinguished from the first by date or by description of other characteristics than his name. The simplest unique, positive, and permanent identification is merely an unrepeatable number or other code symbol which is assigned to each individual (Social Security and other security agencies have proved this). Most commonly this is a serial number related to the appearance of the individual at the numbering point; the first individual is assigned number "1", and each succeeding individual is given the next available number in regular serial order. Other bases may be attempted for this result of uniqueness in identification, but nothing else than temporal serial order is quite so clear and satisfactory—only time never repeats itself. (For that very reason pure serial-number rosters may grow to cumbersome size, unless they are terminated and new series are started from time to time.) Thus each "John Doe" is best identified when he is numbered, uniquely and permanently.

Descriptive codes (involving sex, age, appearance, and so on) are much more versatile than identifying codes, but they do not guarantee uniqueness of coded identity. That no purely descriptive code can insure a unique identifying label may be illustrated by similarly-named twin brothers with parallel histories — their sex, birth date, education and other characteristics probably would be alike or closely similar, hence their code numbers might be identical and therefore non-distinguishing. However such descriptive factors added to a unique identifying code number can tremendously increase its significance and usefulness, especially for group data analysis. In general there are only two universal and simple statistical factors which clearly and permanently describe an individual: his or her sex, and date of birth (keeping out of the area of finger prints, eye color and other qualitative physiological details). In educational situations, equally unchanging are the time and status at which an individual first entered a particular school, and the previous school from which he came. No permanent personal code number should attempt to include such changing data as address, marital status, student or employment classification, and the like (even names are sufficiently subject to change that re-coding must be planned for and made as simple as possible).

Code Construction

One trick in constructing code numbers is the use of certain specified combinations, so that more than one fact or factor will be shown by a single symbol. For example, if married status is indicated by "1", veteran status by "2", foreign status by "4", then unique additive combinations of these factors will be shown by each number from "0" to "7" inclusive; unmarried non-veteran natives will be coded as "0", native married veterans will be coded "3", while all unmarried students will be the total of those coded "0", "2", "4", and "6". Another type of coding combination is that used in IBM alphabetic machines, where each letter involves two concurrent (not additive) numbers or symbols such as "A" being equivalent to "*1", then if "*" is used for married status and "1" for men, married men will be coded "A" while unmarried men will be coded simply "1". Care must be taken in building combination codes that a little space is not being saved at the cost of considerable extra time in both coding and analysis.

... About
the
Author:



Mr. Clifford L. Constance has an extensive background in the Registrar's Office at the University of Oregon. Since 1931, he has successively been Assistant Registrar, Associate Registrar, and now Registrar of this University. He possesses a Bachelor's Degree in Physics and a Master's Degree in Psychology from the University of Oregon.

He has had numerous magazine articles published in various educational and professional periodicals. In addition to being a member of both Phi Beta Kappa and Sigma Xi, scholarship honorary societies, he has taken an active part in the work of the Northwest College Personnel Association, the Pacific Coast Association of Collegiate Registrars, and the American Association of Collegiate Registrars and Admissions Officers.

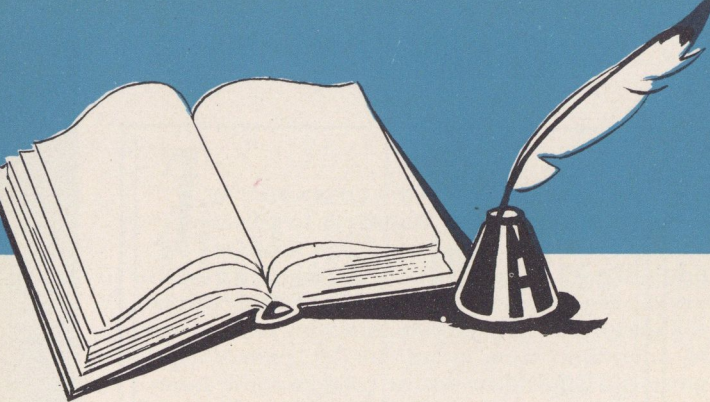
Mr. Constance's article is one that we feel will stimulate thinking amongst tabulating personnel with the inclusion of some of his ideas in proper name coding.

This Registrar's Office is interested in code numbers for University of Oregon students which

Continued on Page 91

Aa-Binz

100	0 Aa 1 Ab 2 Abbott A-I 3 Abbott J-Z 4 Abotta 5 Abe 6 Abi 7 Abi 8 Abraham 9 Abraham	101	0 Ac 1 Acc 2 Ace 3 Ach 4 Aci 5 Ack 6 Ackerman 7 Ackerman 8 Aco 9 Act	102	0 Ad 1 Adams A-C 2 Adams D-F 3 Adams G-I 4 Adams J-L 5 Adams M-R 6 Adams S-Z 7 Adama 8 Adamson 9 Adamson	103	0 Add 1 Ade 2 Adi 3 Adkins 4 Adkins 5 Adi 6 Ado 7 Adr 8 Ader 9 Ader	104	0 Ag 1 Agn 2 Ah 3 Aho 4 Ai 5 Ain 6 Aj 7 Ak 8 Akers 9 Akers	105	0 Al 1 Alb 2 Albert 3 Alberta 4 Albright 5 Albright 6 Alc 7 Ald 8 Alder 9 Alder	106	0 Ale 1 Alexander A-D 2 Alexander E-I 3 Alexander J-Q 4 Alexander R-Z 5 Alexandra 6 Alg 7 Ali 8 Ali 9 Alle	107	0 Allen A-B 1 Allen C-D 2 Allen E-F 3 Allen G-H 4 Allen I-J 5 Allen K-L 6 Allen M-O 7 Allen P-R 8 Allen S-U 9 Allen V-Z	108	0 Allena 1 Alli 2 Allison 3 Allison 4 Allis 5 Alm 6 Alp 7 Alt 8 Alt 9 Alv	109	0 Am 1 Amb 2 Amrose 3 Ambrose 4 Ame 5 Ami 6 Amo 7 Amos 8 Amosa 9 Amu
110	0 An 1 Anb 2 Anc 3 Anco 4 And 5 Ande 6 Andersen A-E 7 Andersen F-L 8 Andersen M-Z 9 Andersen	111	0 Anderson A-B 1 Anderson C-D 2 Anderson E-F 3 Anderson G-H 4 Anderson I-J 5 Anderson K-L 6 Anderson M-O 7 Anderson P-R 8 Anderson S-U 9 Anderson V-Z	112	0 Andersonson 1 Andr 2 Andrews A-I 3 Andrews J-Z 4 Andrews 5 Ang 6 Ange 7 Angi 8 Anh 9 Ani	113	0 Ank 1 Ann 2 Ans 3 Ant 4 Anthony 5 Anthony 6 Ao 7 Ap 8 App 9 Aq	114	0 Ar 1 Arb 2 Arc 3 Archer 4 Archeta 5 Arc 6 Arc 7 Arg 8 Ari 9 Ari	115	0 Arm 1 Arme 2 Armi 3 Armo 4 Arms 5 Armstrong A-D 6 Armstrong E-I 7 Armstrong J-Q 8 Arthur 9 Armstrong	116	0 Arn 1 Arnett 2 Arnetta 3 Arnold A-E 4 Arnold F-L 5 Arnold M-Z 6 Arnold 7 Arn 8 Arthur 9 Arthura	117	0 As 1 Asc 2 Asch 3 Ash 4 Ashe 5 Ash 6 Asht 7 Ask 8 Asp 9 Ast	118	0 At 1 Atk 2 Atkinson 3 Atkinson 4 Att 5 Au 6 Aug 7 Austin A-I 8 Austin J-Z 9 Austina	119	0 Av 1 Ave 2 Aver 3 Avi 4 Aw 5 Ax 6 Ay 7 Avers 8 Ayers 9 Az
120	0 Ba 1 Bab 2 Babb 3 Babb 4 Babc 5 Babco 6 Babe 7 Babi 8 Babo	121	0 Bac 1 Bacc 2 Bacc 3 Bache 4 Bachi 5 Baco 6 Backl 7 Backs 8 Bacon	122	0 Bad 1 Bade 2 Badg 3 Badl 4 Bae 5 Baer 6 Baf 7 Bag 8 Bagl	123	0 Bai 1 Bail 2 Bailey A-C 3 Bailey D-F 4 Bailey G-I 5 Bailey J-L 6 Bailey M-Q 7 Bailey R-S 8 Bailey T-Z	124	0 Bain 1 Baina 2 Baine 3 Bains 4 Bais 5 Baird 6 Baird 7 Bais 8 Bait	125	0 Bak 1 Bakad 2 Bakal 3 Bakal 4 Bakas 5 Bakb 6 Bakc 7 Bake 8 Bakel	126	0 Baker A-B 1 Baker C-D 2 Baker E-F 3 Baker G-H 4 Baker I-J 5 Baker K-L 6 Baker M-O 7 Baker P-R 8 Baker S-U	127	0 Bakera 1 Bakk 2 Bal 3 Bald 4 Baldwin A-E 5 Baldwin F-L 6 Baldwin M-Z 7 Baldwin 8 Balf	128	0 Ball A-I 1 Ball J-Z 2 Balla 3 Ballard 4 Ballard 5 Balli 6 Ballo 7 Ballm 8 Ballt	129	0 Ban 1 Banc 2 Banf 3 Bani 4 Banks 5 Banksa 6 Bann 7 Bant 8 Bao
130	0 Bar 1 Barb 2 Barbe 3 Barber 4 Barbera 5 Barbours 6 Barbours 7 Barc 8 Barcl 9 Barco	131	0 Barde 1 Barde 2 Barbe 3 Barf 4 Barf 5 Barh 6 Barh 7 Barker 8 Barker 9 Barl	132	0 Barn 1 Barnard 2 Barnarda 3 Barnes A-E 4 Barnes F-L 5 Barnes M-Z 6 Barnes 7 Barnett 8 Barnett 9 Baro	133	0 Barr 1 Barra 2 Barrett A-I 3 Barrett J-Z 4 Barretta 5 Barro 6 Barry 7 Barry 8 Barro 9 Barst	134	0 Bart 1 Barte 2 Barth 3 Bartho 4 Bartl 5 Bartlett 6 Bartlett 7 Barton 8 Barton 9 Baru	135	0 Bas 1 Base 2 Bash 3 Bast 4 Bast 5 Bass 6 Bassa 7 Bast 8 Basti 9 Basu	136	0 Bat 1 Batc 2 Bate 3 Bates A-I 4 Bates J-Z 5 Batesa 6 Bath 7 Batm 8 Bats 9 Batt	137	0 Bau 1 Bauer A-E 2 Bauer F-L 3 Bauer M-Z 4 Bauera 5 Baum 6 Baum 7 Bauma 8 Baumg 9 Bav	138	0 Bax 1 Baxter A-I 2 Baxter J-Z 3 Baxter 4 Bay 5 Baye 6 Bayl 7 Bb 8 Bc 9 Bd	139	0 Be 1 Beach 2 Beacha 3 Bead 4 Beal 5 Beall 6 Bealla 7 Bean 8 Bean 9 Beana
140	0 Bear 1 Beard 2 Bearda 3 Beas 4 Beat 5 Beatty 6 Beatty 7 Beau 8 Beaum 9 Bebu	141	0 Bec 1 Beck A-I 2 Beck J-Z 3 Becka 4 Beck A-E 5 Becker F-L 6 Becker M-Z 7 Becker 8 Beh 9 Becks	142	0 Bed 1 Bec 2 Becc 3 Becl 4 Becl 5 Beers 6 Beers 7 Bef 8 Beh 9 Bei	143	0 Bel 1 Belb 2 Belc 3 Belc 4 Bele 5 Belf 6 Belli 7 Beli 8 Belk 9 Belkn	144	0 Bell A-D 1 Bell E-I 2 Bell J-L 3 Bell M-R 4 Bell S-Z 5 Bella 6 Belli 7 Belm 8 Belm 9 Bem	145	0 Ben 1 Bend 2 Bender 3 Bendera 4 Bene 5 Benedict 6 Benedicta 7 Benf 8 Benj 9 Benk	146	0 Benn 1 Benn 2 Bennett A-C 3 Bennett D-F 4 Bennett G-I 5 Bennett J-L 6 Bennett M-R 7 Bennett S-Z 8 Bennetta 9 Beno	147	0 Bens 1 Benson A-D 2 Benson E-I 3 Benson J-Q 4 Benson R-Z 5 Bensona 6 Bentley 7 Bentley 8 Benv 9 Beo	148	0 Ber 1 Berg A-E 2 Berg F-L 3 Berg M-Z 4 Berga 5 Berger 6 Bergera 7 Bergh 8 Bergm 9 Bergs	149	0 Berk 1 Berkl 2 Berl 3 Bern 4 Bernard 5 Bernarda 6 Bernh 7 Berni 8 Bernstein 9 Bernsteina



Histories of Tabulating Associations

National Machine Accountants Association

IN AN ENDEAVOR to develop a history of the National Machine Accountants Association, our search took us to many sections of the country. We learned that, independent of each other, local machine accounting chapters had been formed, meeting monthly attending seminars and dinners in their endeavor to bring about the interchange of ideas on machine accounting applications. In time, these local chapters came to know of each other's existence. Some had been formed seven or eight years ago, while others were just being organized. Discussions on mutual organizational purposes followed in due course.

In endeavoring to further this unity of purpose, independent discussions were held among these chapters toward the formation of a national association with a national charter, in order that these many local chapters could come under a national program. Through these discussions came about the beginning of the National Machine Accountants Association.

As a result, in September 1951, a constitutional convention was held at Chicago. It was at this time that some seventeen local chapters had their delegates in attendance to review the aims and purposes of the National Machine Accountants Association, as well as approving its by-laws. As a result of this constitutional convention, these local chapters are now operating under a national program. Since this time, some thirty-five chapters in cities through the country have become part of the association.

The primary purpose of the National Machine Accountants Association is to advance the status of the men engaged in the field of punched card accounting in the eyes of management and to acquaint the public in general with the scope and place it maintains in business. The term "machine accountant" is applied to those men who are directly connected with the operation and supervision of punched card accounting machines in a supervisory capacity. The membership of this association is not restricted to a specific type of punched card accounting equipment.

The organization is non-partisan, non-sectarian, and non-sectional; and wholly abstains from any

political affiliation for endorsement to public office, and does not sanction any labor affiliation. Its dues are payable at a local chapter level. It is at this local chapter level meetings that all types of punched card applications are discussed in open seminars. Members with similar problems meet to increase their respective funds of information on all uses of punched card equipment.

June 19th through the 21st marked an historic event for the National Machine Accountants Association. Machine accountants from all parts of the United States and Canada attended the first annual convention of this Association. Those machine accountants who visited Minneapolis at this time gained much information through the interchange of ideas at the various seminars. This, in addition to listening to outstanding speakers.

Further information about this association may be obtained by addressing P.O. Box 3910, Merchandise Mart Station, Chicago 54, Illinois.

Insurance Accounting Statistical Association

THE Insurance Accounting and Statistical Association is devoted to the study, research and development of modern theory, practice and procedure as applied to insurance accounting and statistics to the end that we may employ the most efficient, practical and economical methods to meet the increasing demands of management for information regarding the affairs of our companies.

The Genesis of the Insurance Accounting and Statistical Association can be traced to a meeting at Peoria, Illinois, on April 14, 1928, of representatives of eight Illinois and Indiana life insurance companies. The meeting was called a "round table assembly on the use of punched cards." The object of the meeting was stated as "an open house to clarify any problems which the membership might care to have discussed." Fundamentally this principle still permeates the activities of the Association. That insurance companies are still vitally interested in an association which affords an opportunity for the discussion and clarification of their accounting and statistical problems is evidenced by the fact that the membership has steadily increased from this small nucleus of eight member companies to more than 450 life, fire, casualty and accident and health companies.

During the first decade, the activities of the Association were confined to life insurance companies and the discussions were generally limited to accounting and statistical routines for those companies. It became evident that the fire and casualty

affiliates of member life companies were showing an interest in the work of the Association and several representatives of fire and casualty companies had been attending the annual conferences of the Association to seek information which might be helpful in their particular accounting and statistical procedures. As a result of this interest, the organization of the Association was broadened to include, besides a life section, individual sections devoted to the discussion of fire and casualty problems. In 1949, an Accident and Health section was formed.

Further information about this Association may be obtained by addressing L. J. Hale, Kansas City Life Insurance Co., Kansas City, Missouri.

National Tabulating Management Society

THE SEVENTH ANNIVERSARY of the organization of the National Tabulating Management Society is being celebrated this year. This is a service organization devoted to the development of punched card methods and the promotion of interest in the science of tabulating. Those who appeared to look unfavorably upon this organization in its early stages are now enthusiastic in their approval of this society.

Membership in the National Tabulating Management Society is open to all persons actively engaged in the administrative, managerial or supervisory positions in the tabulating field.

The purpose of this organization is to promote and to facilitate the exchange of ideas on all phases of tabulating management through meetings, discussions and publications. Through the many programs, special meetings and seminars, the members of the National Tabulating Management Society have endeavored to promote and stimulate interest on the part of business executives in an effort to coordinate the activities of such executives in developing the science of tabulating systems.

This organization has been quite active in the eastern states, Philadelphia having been the location of its first chapter. Since 1946, the monthly meetings have presented some outstanding speakers with messages of great interest to the machine accountant as a means to further develop the potentialities that lie in management and operation of tabulating installations.

Part of the activities to be of service to the tabulating manager has been the creation and maintenance of a research bureau where tabulating problems are presented for study and analysis. Through the keen interest of its membership, this organization has grown to one of importance in the field of machine accounting and business methods.

Further information about this Society may be obtained by addressing all correspondence to William Short, The Budd Company, Philadelphia, Pennsylvania.

Billing and Inventory Control

Auto Dealer Uses Tabulating Cards

IN AN ENDEAVOR to effect economy measures to prepare billing and inventory controls, IBM punched card accounting equipment was installed at the Louis Rose Company, Parts Division, of Detroit, Michigan. This tabulating installation has been in existence a little over three years and has played an important part in the operations of this company, the world's largest parts wholesaler for the Chrysler Corporation, as well as the world's largest DeSoto and Plymouth dealer.

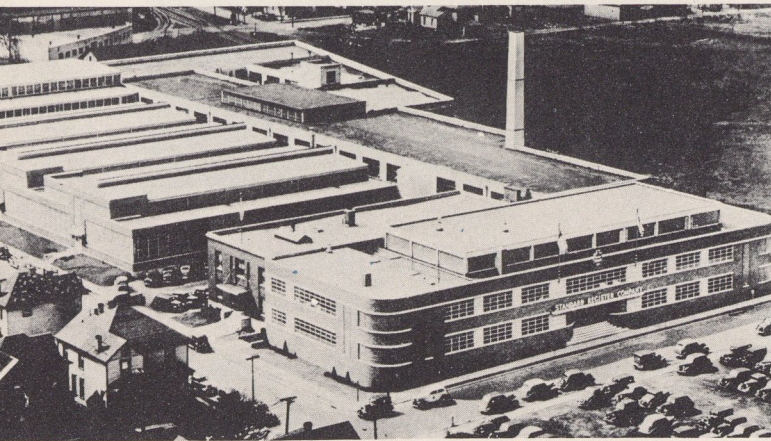
Two types of billing are utilized in this installation. Through the use of tub files with pre-punched parts order identifying information, shipping orders and subsequent billings are expedited in the most efficient manner. Since the tub file on all parts represents the inventory, a simple recapitulation of this file enables a perpetual inventory to be maintained.

A second type of billing is the result of all hand-written invoices. This procedure necessitates punching and verifying a card for each line item. These cards, when multiplied and checked, will be then invoiced on the IBM 405 tabulator the same as the pre-punched cards were originally. As a result, they are able to combine both the pre-punched billing cards with the hand-written invoice punched cards to effect the necessary invoicing through the use of the alphabetical tabulator.

As these bills are listed, a summary card is made for each invoice to record the final total after discounts, taxes and miscellaneous charges have been applied to the machine totals. It is from this summary card that all the accounts receivable and other analyses are obtained.

The development of this simple, but effective billing system is the result of careful planning on the part of Arthur D. Bechtold, office manager for the Louis Rose Company. A native of St. Louis, and a graduate of the Sales Analysis Institute of the Chrysler Corporation, he came to Detroit to install the IBM equipment at this company. With him came an extensive background in machine accounting, which background included operations similar to those now in effect at the Louis Rose Company. Through his foresight and planning, the entire installation of punched card machine accounting methods was in operation within three months. As office manager, it is his intent to bring many more punched card applications into the over-all scope of operations at the Louis Rose Company.

Forms Manufacture



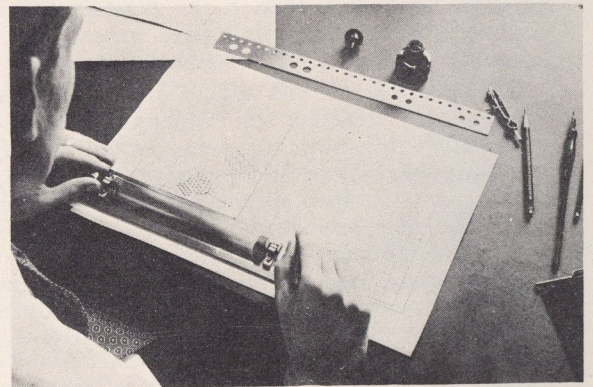
Main Plant—This is a partial view of the home office and forms manufacturing facilities of The Standard Register Company in Dayton, Ohio. Other buildings not shown in this photograph are also located in Dayton for the manufacturing of mechanical devices and auxiliary equipment; also a separate carbon plant.



MACHINE ACCOUNTANTS AND TABULATING SUPERVISORS have, no doubt, spent many hours in the conception and design of forms for use in connection with tabulating equipment. After incorporating these ideas in the design of the form, a forms manufacturer representative is usually called upon to discuss the form prior to the actual order. Shortly after this, the order is placed and it is only a matter of time before the actual order is received from the manufacturer for use in the tabulating department.

Placing The Order—Form company representative and tabulating supervisor discuss proposed form. Before the form can be processed and manufactured, there must be a complete understanding of the requirements of the system. The forms representative must be well versed in tabulating technique, as well as being familiar with the manufacturing processes of his company.

This experience is typical in many tabulating installations. We have often wondered what took place to fill this void from the time an order was placed, until its actual receipt in the form of a finished product. What were the details involved in the manufacturer's operations? To satisfy our curiosity, we journeyed to Dayton, Ohio and visited The Standard Register Company.



Here, we were taken on a tour and watched an order being processed from its receipt at Dayton, Ohio until its shipment to the purchaser. We found this tour most interesting and educational, giving us an insight, and answering the many questions in our mind as to the details involved in the manufacture of continuous forms. No doubt, a tour such as this would be most welcome to many other tabulating personnel.

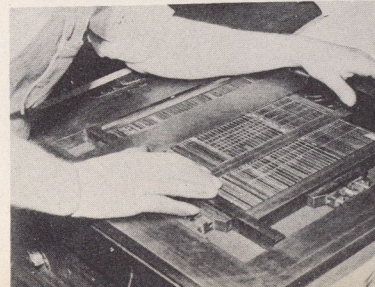
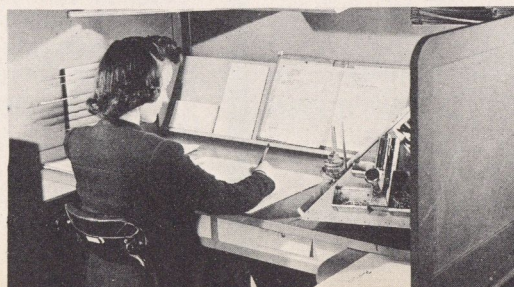
Form Design—Before a form can be entered into production, it is necessary that suitable copy be prepared for the Factory. Here is a form designer making final copy for a continuous form before entering an order into factory for production.

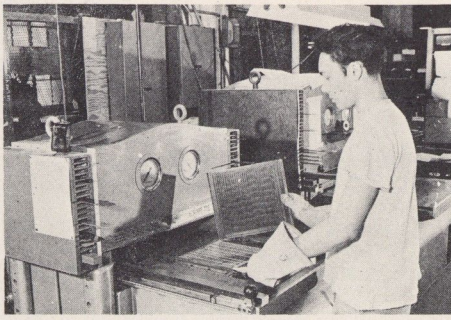
Realizing this, and through the courtesy of The Standard Register Company, we are pleased to present herewith a pictorial tour through its plant. We are sure that you will find, as we did, "your tour" most informative and interesting.

Order Department—Each order is closely checked against business machine requirements, and other requirements for its manufacture. In the files are found all the orders in process, which are used for reference purposes. These are maintained until the order is finally shipped.

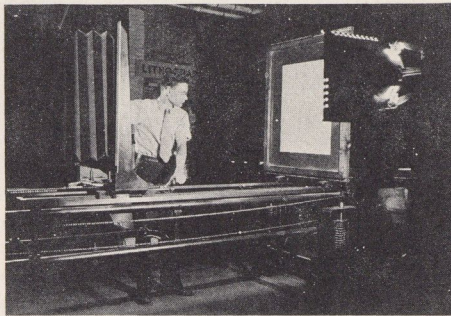
Layout Department—In this department Layout Editors determine the style of type and ruling and other instructions for the Composers.

Composing—Here you see in Comp chase being prepared from which r for letter press printing are produced.

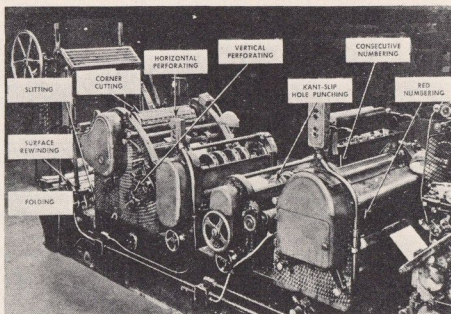




Matrix and Rubber Plate—The matrix is produced from the type chase. This matrix is then used to produce a rubber plate. Shown here is the rubber plate which has been produced from the matrix. Rubber plates have generally replaced metal plates in letter press printing.



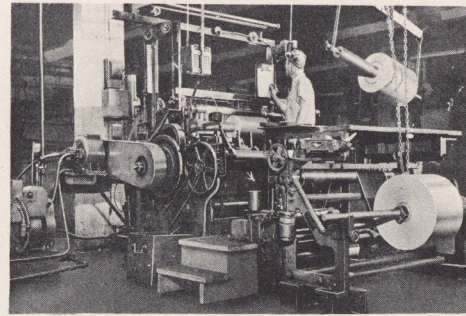
Lithographic Plates—Photo offset printing is done from zinc plates which are produced from photographic negatives. In this photograph the form in double size is being photographed to produce the negative from which the plate will be made.



Diagrammatic Press View—This illustrates all the different operations that are performed on a Standard Register continuous forms press, which make possible the finished form being produced in one operation. This press is capable of producing a three-color printing.



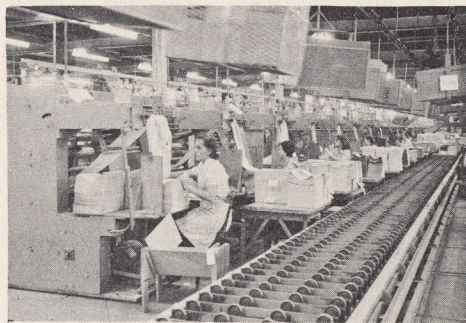
Inspection—Here we see a pressman matching printed copy on a shadow box to determine that vertical and horizontal rules are in the correct positions.



Carbon Slitting Punching—This machine slits and marginally punches carbon which has been produced in continuous rolls.



Collating Department—In this department the one-time continuous carbon is inter-leaved into the continuous forms at a high rate of speed over a pinwheel mechanism similar to that found on the tabulating equipment. These machines run at a much greater speed than will ever be necessary over a tabulator. This operation is actually a speed test of the eventual operation of the forms over a business machine. Miles of automatic conveying equipment move the forms from department to department in Standard's modern continuous forms plant.



Packing—Forms are joggled into uniform packs and then sent to the Boxing Section. Boxes are firmly shimmed and tightly glued, by pressure.



Shipping—Forms are awaiting arrival of the trucks to take them on their way to the customer.

Sales Analysis

By Donald L. Gerighty

THE PRIMARY PURPOSE of most businesses is to realize a profitable return on money invested in the business. Two important factors in making a business profitable are:

1. Maintaining an efficient system of selling a desirable or necessary product.
2. Limiting the money invested in inventories, thereby making more cash available to the business.

Observance of these two factors is made possible by an analysis of the sales records of the business. A manufacturing business concern, which has many customers and a large variety of products, is faced with a tremendous problem when it attempts a realistic analysis of sales history.

Need for Punched Card Accounting

Aeroquip Corporation, a manufacturer of flexible hose assemblies, hose fittings and couplings, was primarily involved with supplying the aircraft industry during the last war. When defense production ceased, the demand for aircraft parts was limited, so the company diverted its products to other industries. As the variety of customers and number of products increased, it became more apparent to management that an efficient method of sales analysis must be devised. The system finally agreed upon was a punched card procedure.

Aeroquip now manufactures over 4000 differ-

... about
the author



Donald L. Gerighty has been supervisor of the Tabulating Department for Aeroquip Corporation at Jackson, Michigan, since 1950. His background in machine accounting dates back to 1945. Prior to coming to Aeroquip Corporation, his record in the machine accounting field notes his work with the U. S. Marine Corps at Cherry Point, North Carolina, the Electric Auto-Lite Company, Kaiser-Fraser Company, and the Army Ordnance Depot at Toledo, Ohio.

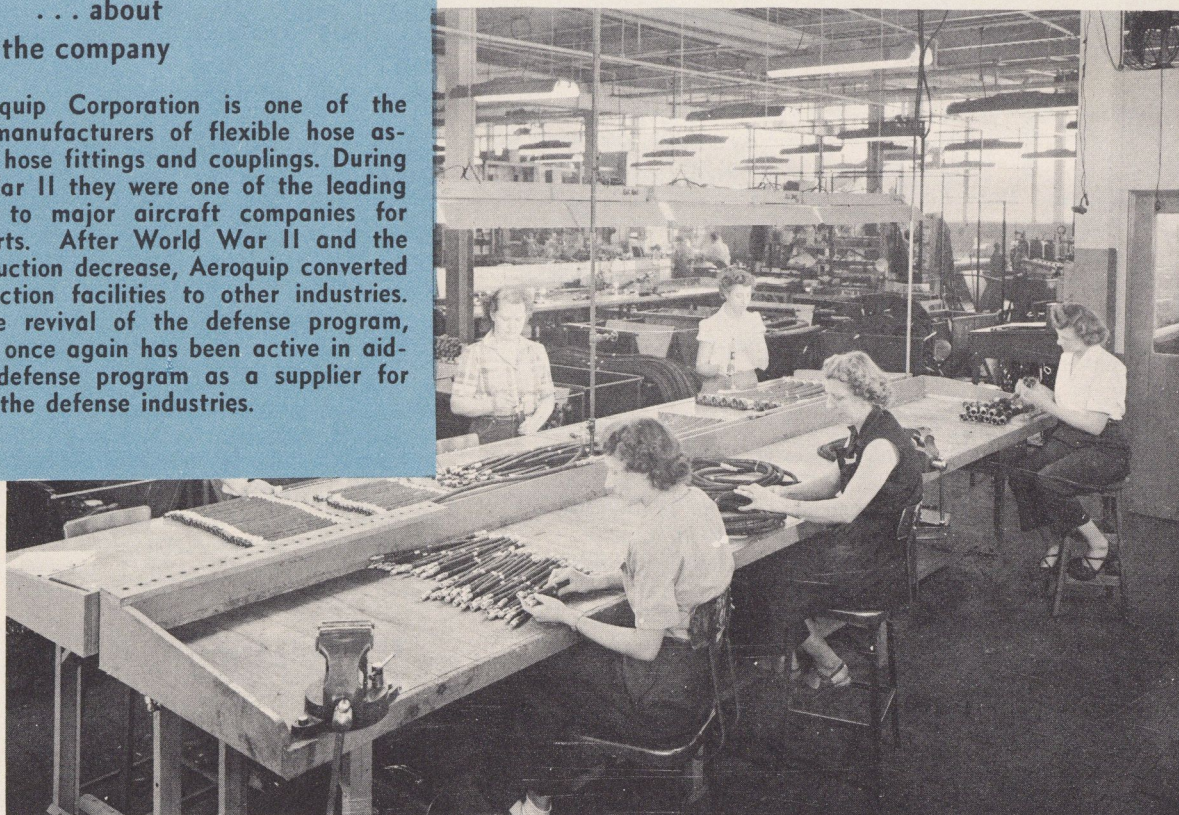
A native of Toledo, Ohio, he attended Dartmouth College and the University of Michigan. In addition to his work as Supervisor of the Tabulating Department, he finds time to assist in the Chapter Development Program as a member of the Steering Committee of the National Machine Accountants Association.

ent parts and ships to over 300 different customers. Cards are punched daily for each item shipped on every invoice. The cards contain not only part numbers and quantity, but sales amount, invoice number, customer and other pertinent information. These cards are then utilized in the machine preparation of the Sales Invoice Register which also shows the accounting distribution of amounts. All invoice cards for a month are matched by part number with a Master Cost File and standard costs are computed and punched into each card. The cards are then used for preparing Cost of Sales reports for the Accounting Department. Two Sales Summary card decks are made from the invoice cards. One deck is a summary of sales by part number; the other is a summary by customer and product class, which is a

AEROQUIP CORPORATION														
SALES ANALYSIS														
Report No. _____ Month of _____														
1. By Product Class 4. By Territory 7. By Sales'm and Prod. Cl. 8. By Part Number 9. Aerocoupling by Part No.														
2. To Aerocoupling 5. By Sales'm & Cust. 6. By Sales'm & Cust. Cl.														
3. By Customer Class														
CUSTOMER NAME	CODE	PART NUMBER				A E R O Q U I P	T E R R. R.	CUST. CLASS	CUST. CODE NO.	Prod. Code	SALES AMOUNT	STANDARD COST AMOUNT	STANDARD GROSS PROFIT AMOUNT	GROSS PROFIT PERCENT
		SERIES	S. A. No.	SIZE	LENGTH									
		CITY			STATE									
HOUSE ACCOUNTS														
ABC COMPANY		TOLEDO			OHIO	0	3	13	1126		173256	94612	78644	
BROWN AIRCRAFT		LOS ANGELES			CAL	0	H	01	1595		2317644	1293114	1024530	
CENTRAL EQUIPMENT		KNOXVILLE			TENN	0	4	15	2270		97285	49837	47448	
CURTIS TRUCK		PHILADELPHIA			PA	0	1	11	2320		55000	33218	21782	
EASTERN OIL SH		CUMBERLAND			MD	0	4	12	3112		326124	187319	138476	
GREAT EASTERN		ALBANY			NY	0	1	07	3651		1036124	598416	437708	
HASTON MARINE		NORFOLK			VA	0	4	11	4040		294300	168203	126097	
HILL HOW - SUP		CHICAGO			ILL	0	E	15	4103		37989	19862	18127	
IRONWOOD AIRC		IRONWOOD			WIS	0	2	04	4315		157260	83988	73272	
INTERCITY AIRC		NEW YORK			NY	0	1	07	4278		12864850	7137316	5727534	
											17359432*	9605885*	7694018*	

... about
the company

Aeroquip Corporation is one of the leading manufacturers of flexible hose assemblies, hose fittings and couplings. During World War II they were one of the leading suppliers to major aircraft companies for these parts. After World War II and the war production decrease, Aeroquip converted its production facilities to other industries. Since the revival of the defense program, Aeroquip once again has been active in aiding the defense program as a supplier for many of the defense industries.



major grouping of similar parts. Sales Analysis reports in seven different sequences, such as: by part number, by salesman and customer, by class of customer, etc., are prepared from the Sales Summary cards. These reports make available to management invaluable information and indicate sales trends.

Because of the many diversified industries supplied by Aeroquip, a detailed study of the sales trends by industry and customer is necessary. This then forms a basis for future planning and policy. Although this program is somewhat restricted by the present emergency it is still useful and will be of great importance as historical material, when business returns to normal. Copies of the Sales Analysis, by salesman and customer, are sent to the salesman and serve as commission statements. The detail sales cards also provide a source for information required by the government in connection with the Controlled Materials Plan and renegotiable sales on defense contracts.

Forecasting Future Demands

The establishment of inventory requirements demands a study of several relative factors. Two known factors are derived from existing unfilled orders and current "on hand" inventory figures. Another factor to be considered is the anticipated new orders that will be received and scheduled

over a given period of time. Detailed forecasting of future demands is based on information derived from the Sales Analysis reports supplemented by advice from the salesmen in the field. Because of the fact that Aeroquip purchases many component parts from sub-contractors it is necessary to establish and consider lead time (time between placement of order and receipt of material) required for each part.

All of these factors for each part are combined and projected by month. The resultant figures are then a basis for production scheduling and purchase requirements for parts and raw material. Thus it is possible to maintain sufficient inventory to meet demands without unduly tying up funds in a stockpile of slow moving material and parts. This program becomes increasingly important under the present emergency and critical materials situation. Compilation of detailed figures required by a program of this nature would be practically impossible and certainly obsolete if it were attempted manually. The use of punched card procedures for preparing Sales Analysis, Order Backlog Analysis and Inventory simplifies the job and provides management with the type of information which is needed to maintain efficient control of the business.

Daily Paper Inventory

Nekoosa-Edwards Paper Company
Port Edwards, Wisconsin

THIS REPORT shows the Sales Department the inventory of paper by reams, on hand at 7:00 A.M. each day in both our Nekoosa and Port Edwards mills. The report shows the grade, color, basis, put-up, and grain specification, and the amount on hand, stock available, orders unshipped, orders scheduled and orders to date.

The following method is used:

1. A master card is prepared and placed in an active file. This card contains the description of all paper made by Nekoosa-Edwards Paper Company showing grade, color, basis, size, put-up, and grain specification.

2. When customer's order is received, a detail card is punched for each item.

3. Order cards (Item 2) are reproduced for entry in an active file.

4. When placed in an active file, X distribution prints the numbers of reams in columns C, D, and E, and if order is to be shipped from stock, two X's are punched in card and amounts are subtracted from column B and added in

columns C and E.

5. When paper is packed for such orders, a card is prepared at the mills to show paper on order. This card adds column A and stock cards add in A, B.

6. When paper is shipped, order cards are pulled from the order file and placed in an active file. These cards are subtracted from A, C, and D for manufactured orders, and stock orders subtracted from A and C.

This report gives the Sales Department a complete analysis of customer's orders, amount of paper in stock, and the functioning of the Shipping Department on a daily inventory basis. The operations involved are simple, yet are sufficient to provide the necessary data.

By E. L. Ticknor,
Tabulating Supervisor



PORT EDWARDS FORM NO. T-2-1						PAPER INVENTORY					DATE				
GRADE	COLOR	SUB. OR BASIS	STYLE	PUT UP	PACKING	WIDTH	SIZE	AMOUNT ON HAND	STOCK AVAILABLE	TOTAL UNSHIPPED ORDERS	SCHEDULED ORDERS	ORDERS TO DATE			
NEKOOSA BOND	WHITE	16	MSH PK	PRPCK	PACKETS	3	10 1/2	A	B	C	D	E			
						8	11								
						8 1/2	11								
						8 1/2	11								
						8 1/2	11								
						8 1/2	13								
						8 1/2	13 1/2								
						8 1/2	14								
						8 1/2	14								
						11	17								
NEKOOSA BOND	WHITE	20	PRPCK	BOXES	PAKTS	30	4 1/4								
						33	4 1/2								
						34	4 1/2								
						34 1/4	4 1/4								
						35	4 1/2								
						8	10 1/4								
						8 1/2	10 1/4								
						8 1/2	11								
						8 1/2	11								
						8 1/2	11								
NEKOOSA BOND	WHITE	20	PRPCK	BOXES	PAKTS	8 1/2	13								
						8 1/2	13								
						8 1/2	14								
						8 1/2	14								
						8 1/2	14								
						8 1/2	14								
						8 1/2	14								
						8 1/2	14								
						8 1/2	14								
						8 1/2	14								

Payroll Accounting

Continued from Page 30

X (gang-punched) 80

The employee identification cards are merged in front of the payroll register summary cards controlling on clock number (50-53) with selection of unequal primaries and secondaries. Selected unequal secondaries are in error and are investigated for correction.

The payroll envelopes are tabulated, listing the employee identification factors and totalling the hours, wages, and deductions on intermediate totals controlling on clock number.

The *payroll register*, *absentee-termination register*, and the *payroll envelopes* are forwarded to the payroll department, where they are verified and approved or adjustments requested when necessary. The cards are zone sorted on column 80. The X-80 cards (employee identification) are destroyed and the No. X-80 cards (Payroll register summaries) are filed for the monthly payroll register.

Special Deductions Listings

The payroll register detail cards held aside in earlier step are separated as follows:

- a) Zone sort column 47-X47 cards (earnings detail) are held one week and destroyed.
- b) Zone sort the balance on column 70-X70 cards (gross wages summary cards) are held one week and destroyed.
- c) Sort the balance (deduction cards) on column 58 removing Federal Credit Union (1's) Bonds (7's) Smocks, Keys and Union Deductions (8's).

The 1's and 7's (c-above) *deductions* and the 1's and 7's *deductions not made* cards are sorted separately by book Number (57-54). They are tabulated separately for the following:

- a) Federal Credit Union—Deductions
- b) Federal Credit Union—No Deductions
- c) Bond—Deductions
- d) Bond—No Deductions

The listings are forwarded to the Federal Credit Union Office and indicate the following; Employee Name, Book Number, Clock Number, Employee Amount.

Totals are indicated for the four groups and verified to the controls.

The 8's (c-paragraph above) *deductions* and the 8's *deductions not made* cards are sorted separately alphabetically on column 5-1 of employee name. They are tabulated separately for the following:

- a) Union Dues—Deductions
- b) Union Dues—No Deductions

The listings are forwarded to the payroll department and indicate the following; Clock No., Name, Deduction Amount.

Deduction cards with fixed amounts and controls are filed for the following weeks payroll. They include Federal Credit Union, Group Insurance, McKesson Employee Association, and Bonds.

Deduction cards for Union Dues are filed for control of each employee's dues being deducted once each month. Deduction cards are destroyed for employee terminations, miscellaneous, smocks and keys deductions.

Employee Termination master cards are placed on file for seven years and destroyed.

Accumulative Earnings and F. I. C. A. Deductions

Each week during the months of October, November and December except the last week of each month (the monthly payroll register supplies similar information for the last week) the total earnings and F.I.C.A. deductions are tabulated for each employee and forwarded to the Payroll department. The purpose is to aid in calculating the end of the year F.I.C.A. deductions and the final amount for a specific payroll for each employee.

Each week the weekly payroll summaries are merged behind the current monthly payroll register file (File includes the monthly register name cards, previous month's register summary cards, and current month weekly summaries—in sequence as listed within clock No.) by clock No. (50-53). The office and factory payrolls are processed separately.

The combined cards are tabulated using the permanent "Monthly Payroll Register" board. The cards are re-run for totals and checked to controls. The cards are returned to file and the tabulation forwarded to the payroll department.

for

- EFFICIENCY
- ECONOMY
- CONTROL

TABULATING FORMS . . .

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FORMALINERS . . .

—for accurate form control.

*We feature a large variety
of Stock Tabulating Forms.*

MOORE



BUSINESS FORMS, INC.

Pacific Division

Consult your phone book
for your local Moore Representative.

DATE	VOUCHER NUMBER	STATE	ACCOUNT NUMBER	STATE TOTAL	ACCOUNT TOTAL
4 28 52	648840	46		100	
4 30 52	649148			1339	
		46	308	1439	*
4 30 52	649148	52		1308	
		52	308	1308	*
4 10 52	647216	53		268	
		53	308	268	*
				3015	*
4 2 52	646289	46		37	
		46	309	37	*
				37	*
4 25 52	648687	2		156	
		2	311	156	*
4 4 52	646474	4		309	
		4	311	309	*
4 1 52	646040	5		55	
		5	311	55	*
4 1 52	646163	6		699	
		6	311	699	*
				1219	*
					*
					4271 *

Disbursement Report

Disbursement Cards

0509522167577431230000024504200029984

05095221675774330000029739

05095221675774331300000051

05095221675774331200000609

05095221675774330000020495

ACCOUNTING

SERIAL NUMBER

RECEIPT DATE

RECEIPT AMOUNT

DISTRIBUTION DATE

ACCOUNT NUMBER

DISTRIBUTION AMOUNT

DISBURSEMENTS

CASH RECEIPTS

IBN 787278

After the tapes have been key punched, they are totaled on the tabulator to check that the total amount appearing on the cash tape and the total of the amount punched in the cards are in balance. Cards are then released to the accounting department where they are accumulated in serial number sequence. This is automatic inasmuch as the cash receipts are received in serial number sequence and does not call for any manual sorting.

In the meantime, the cash tickets released to the respective departments are being worked. It is in these departments that the total cash receipt amount is being distributed to their proper accounts.

When this information has been noted on the cash ticket, they are returned to the accounting department. Here, the clerk notes the distribution made. In the event that the total amount received is being distributed to one account, the corresponding cash ticket is placed in the same sequence to that of the tabulating card. In the event that the total amount received is being distributed to two or more accounts, the clerk places the cash ticket in sequence with the tabulating card by adding the necessary number of blank cards behind this tabulating card in order that separate cards may be set up for distribution to each of the accounts noted.

When a box of these tabulating cards and cash tickets has been accumulated, they are forwarded to the tabulating department. At this point, the key punch operator punches the distribution portion of the card. The information key punched from the cash ticket are the accounts and amounts affected by this distribution.

When these boxes are completed, they are balanced through the tabulator. This balancing notes that the total amount distributed should equal the amount received. This balancing is necessary because if there are two or more cards punched, only the master card will note the original received amount whereas the distributed cards will have a break-down of this original amount punched in the distribution field.

These cards are accumulated until the end of the month at which time they are combined and sorted on serial number, within state and account.

A listing is made of the cards indicating all card information and taking minor totals on state, intermediate totals on account number and a grand total for the entire report. Summary cards are cut on each minor control. These summary cards are used to effect a recapitulation of this report. They are also set aside and later combined with the disbursement summary cards by state and account for a summary of income and disbursements used by the accounting department.

Many related reports are prepared from these summary cards to serve the different departments interested in the income and disbursements for specific accounts that they are concerned with in their departmental operations.

Tabulating Card Payroll Checks

IN REALIZING the objective to effect a mechanized payroll, the end result provides a tabulating card check.

A basic payroll history card is established for each employee. This card contains the payroll data on each employee, including personnel statistics, payroll-wise, as well as deductions, etc.

This payroll data card is received from the accounting department which maintains these records. From this card, the corresponding information is key punched. Once this initial tabulating card is set up, it is not necessary to refer to the history card until basic payroll data is changed. Changes are made in the tabulating cards when the changes in the payroll history status are recorded. It is at this time that a payroll change notice is received in the tabulating department, advising them to change the basic tabulating card accordingly as noted on the change slip.

The payroll is processed bi-weekly. Employees are paid on the Thursday of that week, but amount of check includes Friday. Thursday was selected because of lesser activity in the bank on that day, making it easier for employees to cash checks. On Monday before payday, the tabulating cards are received in the tabulating department. These cards include the basic payroll cards (manila) and temporary payroll cards (green—for changes that apply for this pay period only). These cards are listed to prepare the payroll register. After the register has been listed, the totals are cross-checked to see that they are in balance. After they have been found in balance, cards are made for the necessary deductions and

37577	A	125	L26	CR	2,059.14
37577	A	654	L38	CR	2,059.14
37577	A	99	57	CR	2,059.14
37577	A	121	D45	CR	1,000.00
37577	A	72	52	CR	0.00
37577	A	77	6	CR	2,059.14
37577	A	76	56	CR	17.33
37577	A	27	18	CR	2,059.14
37577	A	23	D45	CR	0.00
37577	A	121	D45	CR	0.00

Cash Receipts Tape

THE MACCABEES					
37577	A	99	57	CR	2,059.14
1200	1000	200	9	117	205
1200	1000	256	26	137	210
1200	1000	256	4	59.14	210
200	266				57

Income Distribution Ticket

check payments to various agencies, such as income tax, community fund, credit union, union dues, hospitalization, etc. These specially prepared cards are included as part of the payroll in order that checks will be made for them.

Using the bill feed, the payroll cards are listed and totaled to print both a check and deduction statement. This is accomplished by feeding two separate forms through the bill feed.

After the checks have been processed through the bill feed, the net pay and employee number are reproduced from the detail payroll cards into the card check. As a result, check number, date, employee number, and amount appear in the tabulating card check. These checks are then reproduced column for column into a stock card which is used as a check reconciliation card.

The detail payroll cards are used to prepare separate listings on gross pay, O.A.S.I., bonds,

income tax, overtime, insurance, union dues, hospitalization, etc., as part of the payroll accounting records to tie in with the complete payroll register to serve other departments interested in these special listings.

When the bank statements are received, the card checks, with the bank statement, adding machine tape, are forwarded to the tabulating department. Here the checks are tabulated to balance with the adding machine tape. Once these groups are in balance, all the checks are sorted by check number and processed against the reconciliation file to determine outstanding checks. Listing of both cashed and outstanding checks are made for the accounting department.

The experience in handling tabulating card checks has been excellent. One reason for this may be the fact that these checks are localized within the office area with the exception of a few that are sent throughout the country.

Income Distribution Report

DATE	SERIAL NUMBER	STATE	ACCOUNT	STATE AMOUNT	ACCOUNT AMOUNT
4 21 52	33910	46		63	
		46	304	63	.
4 28 52	34809	53		308	
		53	304	308	.
					371 .
4 21 52	29825	26		1465	
4 21 52	33964			1559	
		26	452	3024	.
					3024 .
4 21 52	31106	26		180	
4 21 52	31738			9824	
4 21 52	31740			7320	
		26	485	17324	.
4 21 52	30783	33		257	
		33	485	257	.
4 21 52	29157	46		753	
		46	485	753	.
					18334 .
					.
					21729 .

3 7 5 7 7

0509520205914

ACCOUNTING

DISBURSEMENTS

CASH RECEIPTS

ACCOUNTING

DISBURSEMENTS

CASH RECEIPTS

Income Distribution Cards

REGISTER

NAME	SALARY	O.A.B.	BONDS	PENSION	HOSPITAL	INCOME TAX	UNION DUES	MACCABEES RATES	CREDIT UNION	2.	NET PAY
A B C D E F G H I J K L M N O P Q R	12462	187	1875	250	330	2010	250	675	500	3250	3135
Z Y X W V U T A B C D E F G H	11275	127	625	250	330	1275	250	325	100	725	7368
A B C D E F G H I J K L M N O P Q R	12462	187	325	250	360	1426	250	1305	250	325	7784

The **MACCABEES**
5057 Woodward Avenue
DETROIT 2, MICHIGAN

CHECK
NUMBER
$$\frac{9.32}{720}$$

PAY TO THE ORDER OF
A B C D E F G H I J K L M N O P Q R

51	52	10	51
MONTH	DAY	YEAR	EMPLOYEE NUMBER

EXACTLY 031 DOLLARS AND 35 CENTS

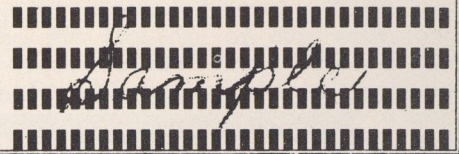
DOLLARS	-CENTS
\$031	AND 35

THE MACCABEES - PAYROLL ACCOUNT



NATIONAL BANK OF DETROIT
WOODWARD - PUTNAM - 26
DETROIT 2, MICHIGAN

IBM 141535



STATEMENT OF EARNINGS AND DEDUCTIONS

PAY PERIOD ENDING		SOCIAL SECURITY NUMBER			EMPLOYEE NUMBER		GROSS PAY	O. A. B.	BONDS
51	3523	77	20	76	6910	5131	2462	187	1875

HOSPITAL	UNION DUES	PENSION	INCOME TAX	MACCABEES RATES	CREDIT UNION	MISCEL- LANEOUS	NET PAY
330	250	250	02010	675	500	3250	3135

THE MACCABEES

DETROIT 2, MICHIGAN

- DO NOT FOLD OR SPINDLE YOUR CHECK

KEEP YOUR CHECK STUBS

IBM 766106

[illegible]

IBM 756188

812

the Punched Card

Proper Name Codes

Continued from Page 76

will (a) identify uniquely so that by IBM machines alone we can sort together all the related cards for each student, and (b) describe students' characteristics as fully as is practicable so that we can sort out by categories and then produce lists and statistics. Our "student number" includes code designations for the student's name and for his date of entrance into the University, and a serial number for unique identification; these encompass eight digits or eight card columns. (Apparently we are contradicting our own previous advice to identify by sex and birth date, but these data are not always known with certainty at the time we set up our "student number".) These eight digits appear on and in every IBM card for "John Doe" and are entered on his permanent record sheet as the code-equivalent to his name in University files. We set up and record nine more digits as numerical equivalents for several other permanent characteristics, and utilize them as needed for statistical objectives. Thus in seventeen digits we have clearly identified "John Doe" and described nine of his permanent attributes. The full coding schedule is detailed below:

- (a) Name code: four digits, from the nine-thousand-division alphabetic code described later;
- (b) Year of first University of Oregon work: two digits, last two digits of year (as "51" for 1951-52 fall terms, or "52" for 1951-52 winter or spring term);
- (c) Term of first University of Oregon work: one digit, "1" for winter term, "2" for spring term, "3" (and "4" if needed) for summer session, "5" (and "6", "7", "8", "9" if needed) for fall terms;
- (d) Serial number: one digit, assigned in serial order to students with same seven digits from preceding factors;
- (e) Sex: one digit, "1" for male, "2" for female;
- (f) Year of birth: two digits, last two digits of year (as "31" for 1931);
- (g) School last attended before entering University of Oregon: four digits, from a special local code;
- (h) Entrance standings: two digits, one for rating on preparatory-school grades and one for score on entrance college-ability examination.

Two illustrative code numbers for "John Doe" might be "2857 50 1 1 1 31 3231 87" and "2857 51 3 2 1 31 7555 -7". The first number would show that he entered the University in the winter term of 1949-50, from Eugene High School with stanine-8 grades. The second number shows him as entering the University in the summer of 1951, from Oregon State College (no high-school stanine available). Both numbers show the same alphabetic code number, sex, year of birth, and entrance-examination stanine (digits one to four, nine to eleven, and seventeen of the series). Both uniquely identify the particular "John Doe" by the first eight digits, and additionally describe him by the last nine digits.

In a code for proper names, numbers are substituted for letters or combinations of letters and the alphabet is broken into a certain large number of divisions so that each name will be matched with an assigned numeric-alphabetic equivalent. These equivalent code numbers by themselves are not adequate to rigorously identify or describe individuals, but they greatly aid in the orderly handling of large groups especially with machines for sorting (which constitutes filing). (Possibly it should be explained that students' records are filed by precise alphabetization in our "inactive files", but by student number in our "active files" which are involved in IBM machine operations.) The translation from twenty-six letters into ten digits obviously cannot be simple, particularly when we wish to use the ten digits as evenly as possible and we start with tremendous differences in use of the twenty-six letters; another difficulty is that frequency distributions of proper name rosters break the alphabet better into nine sections (AB, CD, EFG, HIJ, KL, MN, OPQR, S, TUVWXYZ) than into ten sections. In our new name code of nine thousands divisions we have tried to spread the alphabet as evenly as possible over the total nine thousand, that is to split an alphabetic array of all proper names into nine thousand equally-used parts. Checks we have made against large rosters indicate that a gratifying degree of success has been achieved. The patterns of alphabetic-numeric equivalents has been arranged so as to place the breaks between initial letters at significant breaks in the number sequence. A numeric equivalent has been defined for every two-letter alphabetic combination, except under "Q" and "X". The number of specified names (like "Smith" and "Jones") in the code has been kept down, since these interfere somewhat with systematic scanning from letter to letter. The section assigned to "Mc" has been made almost exactly the same length as that for "Ma", and they may be interchanged to conform to local practice.

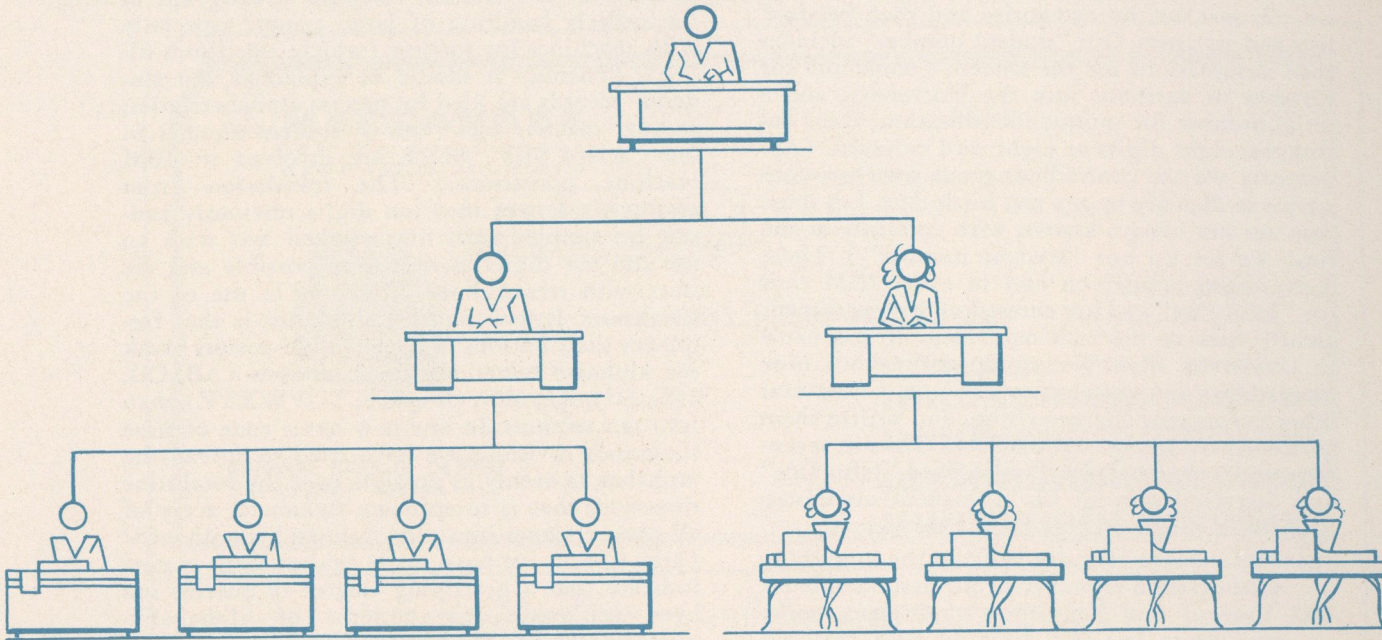
Code Numbers Parallel Alphabet

This code provides numerical equivalents to names (paralleling the alphabet from Aa to Zz with numbers 1000 to 9999), for fine identification and alphabetization with IBM and other mechanical operations. It follows and improves upon two other codes developed and used at the University of Oregon. The first of these included ten thousand divisions, and was built upon most of the possible three-letter combinations, expanded where the greatest frequency of names occurred; it was published in 1935 as Chapter V, Part II, of "Practical Applications of the Punched Card Method in Colleges and Universities." The second previous code included only nine hundred divisions, for simplicity, and was based entirely on frequency; it constitutes the column heading of the code presented herewith. The first of these earlier codes did not give an even spread of numbers nor were its dividing points particularly convenient in machine operations; the second gave an excellent spread but did not alphabetize

Continued on Page 131

How Does A Supervisor Develop The Most Productive Work Group?

By Irving Weinstock



MANAGEMENT THINKING has tended more and more, in recent years, to be concerned with the worker as an individual. We have become very much aware, and most properly so, that workers are people — with very human wants, desires, attitudes and responses.

However, without in any way even implying a return to assembly-line concepts, it does appear equally important that we not lose sight of the fact that most jobs, from a production point of view, at least, are accomplished by teamwork—a pulling together by all members of the group, imbued with a common purpose and responsive to understanding, progressive leadership.

This is where the supervisor comes in. Assuming as a pre-condition that organizational policy is such as to:

1. Clearly define the individual supervisor's areas of responsibility for operations, processes, production, staff, supplies, training and the like.
2. Delegate to the supervisor authority compatible with his assigned responsibilities.
3. "Back up" the supervisor by establishing and following clear-cut lines of authority, both vertical and horizontal.

We may be virtually certain that the necessary environment has been created in which the supervisor may consciously strive for the development and maintenance of the most productive work group. Supervision, like any other activity entailing relationships, does not exist in a "pure" state; rather, it is an integral part of a process which is aiming toward and assisting in the

achievement of mutual objectives.

The next step, therefore, is dependent, in good part, upon the supervisor himself. In any job the supervisor's approach is determined by two basic sets of circumstances: Those which are established by company policy (discussed above) and those which result from the supervisor's personal characteristics and abilities. These latter include such factors as:

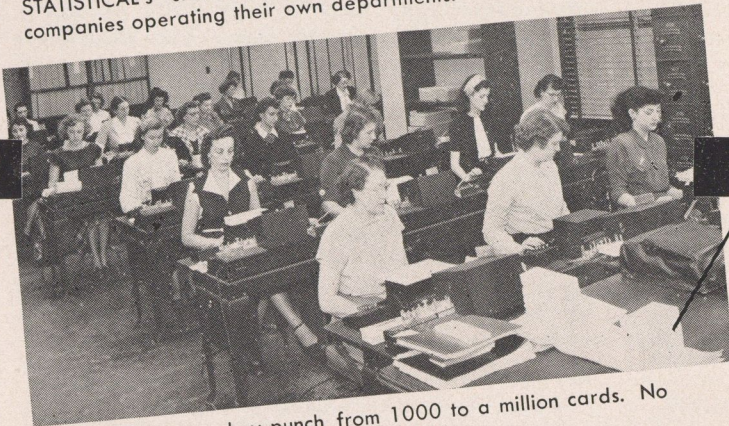
1. *Knowing the job.* Supervision is not just a matter of "getting others to do assigned tasks properly." It calls for actual knowledge of all the various jobs under the supervisor's control to the end that he may not only plan, control, and follow up operations and train others, but, most important perhaps, obtain and retain the respect of subordinates as one who knows what has to be done and how well it is being done.

2. *Willingness to delegate responsibility.* The good supervisor goes out of his way to develop people, takes advantage of the fact that he has capable personnel and utilizes these facts to delegate responsibility. He realizes that indispensability is a myth and is not afraid to teach others so that work can continue in case of his absence or departure. He is as aware that sharing responsibility creates interest and initiative as he is that a one-man show destroys them. The supervisor, in his shared responsibilities, must clearly define their limits and extents; he must not supersede the subordinate to whom he has delegated responsibility just to show off his own power or to issue direct orders himself in the area assigned.

Continued on Page 142



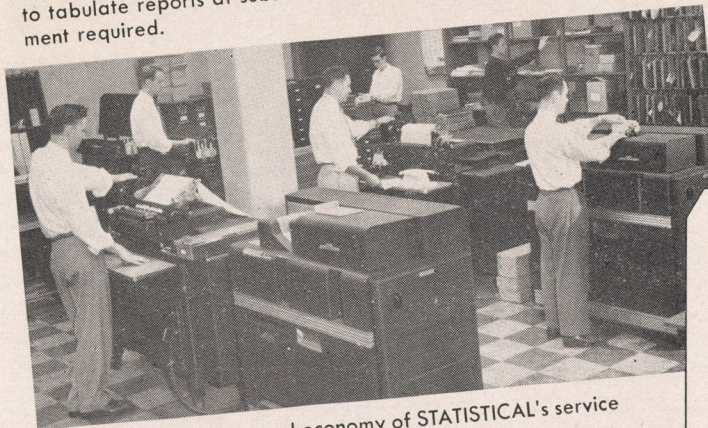
STATISTICAL's "stand-by" facilities have proved invaluable to companies operating their own departments.



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for illustrated brochure.**



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Premium Billing Forms

MOORE BUSINESS FORMS, INC. has developed a premium billing form that has proven ideally suited for the insurance industry after being successfully used by some of the larger firms for the past several years. These forms are especially adaptable for use in home offices, branch offices and large direct billing agencies having a large volume of premium billings.

Any Number of Carbons

The product is a double-stub Fanfold one-time carbon set that can be readily processed over an addressograph machine, tabulating machine or typewriter. It is also available as a single one-time carbon Speediset. It is designed to permit easy separation of each billing set from the other, easy carbon extraction and, at the same time, is constructed to allow all carbon copies used in subsequent operations to remain together as one unit, thereby solving the old problem of handling loose carbon copies.

The multiple continuous set may contain practically any number of carbon copies. A suggested set may include the following:

1. Premium due notice
2. A record of payment or receipt
3. Reminder notice
4. Lapse notice
5. Agent's commission copy
6. Office posting copy
7. Expiration copy

The form has two pasted side stubs. One pasted stub holds all sheets together as one unit in the stub, and the other stub holds all the carbons, as well as the printed sheets. The carbons can vary in length to eliminate unwanted data on some of the parts. After the form is prepared, the sets are separated and the stub holding the carbons is discarded. The premium notice is mailed to the policyholder and the remaining parts of the set are held together by the other stub in an unpaid file.

If payment is not received within the specified time, the set is withdrawn from the file and the reminder notice, calling attention to the due date, detached and mailed. Should the policy be allowed to lapse, the same procedure is followed for the lapse notice, which sets forth the conditions under which the policy may be reinstated.

Procedure Upon Payment

When payment is received, the balance of the

billing set is withdrawn from the unpaid file, the receipt detached and mailed, the office posting copy balanced to incoming cash and payment, posted to the collection record card and the agent's commission copy filed alphabetically by agent for commission payment later. The expiration copy is filed ahead by next due date and is used as the signal to prepare a new premium notice set at the proper time.

At commission payment date, all of any given agent's commission copies can be totaled quickly, the commission rate applied and a check drawn for the commission due. This check together with the commission copies, representing a detail of all items paid, can be sent to the agent. Thus, as part of the billing procedure the commission accounting also is accomplished.

Advantages

Some of the advantages of this direct billing system are:

1. Continuous billing provides speed of preparation
2. All billing, receipt, expiration, accounting and commission payment forms can be prepared in one writing operation
3. All carbon copies of the premium billing held together as one unit by the pasted stub instead of loose sheets
4. Conservative procedure becomes a by-product of premium billing
5. Automatic expiration plan calls attention at proper date to the need for preparation of next renewal notice

The various number and style of forms contained within each set can be tailor-made to fit the specific requirements of each company.

In addition to providing insurance firms with this efficient method of preparing a repetitive billing, Moore Business Forms, Inc., also manufactures a forms detacher which automatically detaches continuous premium notices at the rate of 15,000 sets per hour. If desired, an imprinter attachment also can be attached to the detacher to imprint on each premium notice additional information, such as the "paying office." Moore's premium billing form is only one of the products the firm markets in supplying "the right business form for every form of business."

COUNTRY LIFE INSURANCE COMPANY
 43 EAST OHIO STREET • *Chicago 11, Illinois*

ACCIDENT INSURANCE PREMIUM NOTICE OF LAPSE

SEMI-ANNUAL
PREMIUM DUE

LESS DIVIDEND

POLICY NUMBER

OCCUPATION

DATE DUE

DAY OF

PAY LAST
AMOUNT ↑

This accident policy lapsed on the date shown hereon. In the best interests of the Policyholder, the Farm Bureau, and the Company, may we suggest that the agent interview the person named below at once in an effort to secure a renewal.

NOTICE OF PAYMENT DUE

IT'S TIME TO RENEW: THE RENEWAL PREMIUM ON YOUR ACCIDENT, SICKNESS OR HOSPITALIZATION POLICY IS DUE AS SHOWN BELOW. TO AVOID LOSS OF YOUR PROTECTION, PAYMENT MUST BE MADE ON OR BEFORE THE EXPIRATION DATE.

"KEEP YOUR EARNINGS INSURED AND YOU PROTECT ALL"

PAY PREMIUM TO: **Continental Casualty Company** INTERMEDIATE DIVISION
AT ADDRESS SHOWN ON ENCLOSED ENVELOPE

PREMIUM	
\$	AMOUNT DUE
EXPIRATION DATE	
MO.	DAY YR.

POLICY NUMBER

BE SURE TO RETURN THIS COPY WITH YOUR REMITTANCE

COUNTRY LIFE INSURANCE COMPANY
 43 EAST OHIO STREET • *Chicago 11, Illinois*

ACCIDENT INSURANCE PREMIUM FINAL NOTICE!

SEMI-ANNUAL
PREMIUM DUE

LESS DIVIDEND

POLICY NUMBER

OCCUPATION

DATE DUE

DAY OF

PAY LAST
AMOUNT ↑

PLEASE RETURN THIS PREMIUM NOTICE WITH YOUR REMITTANCE
DISREGARD IF YOU HAVE SENT YOUR REMITTANCE. RECEIPT WILL BE MAILED PROMPTLY.

DANGER! FINAL NOTICE!

KEEP THIS COPY

Continental Casualty Company
310 SOUTH MICHIGAN AVENUE • CHICAGO 4, ILLINOIS
INTERMEDIATE ACCIDENT AND HEALTH DIVISION

KEEP THIS COPY AND RETURN THE GREEN PREMIUM NOTICE WITH YOUR REMITTANCE

PREMIUM	
\$	AMOUNT DUE
EXPIRATION DATE	
MO.	DAY YR.

POLICY NUMBER

YOUR RECORD OF MAILING PREMIUM

This is for your use as a record of mailing premium. For your own protection send your premium by check or money order which will serve as your receipt. A notice of receipt will be sent only upon written request.

CHECK OR MONEY ORDER NO. _____ DATE MAILED _____

COUNTRY LIFE INSURANCE COMPANY
 43 EAST OHIO STREET • *Chicago 11, Illinois*

ACCIDENT INSURANCE PREMIUM RENEWAL RECEIPT

RECEIVED

SEMI-ANNUAL
PREMIUM

LESS DIVIDEND

POLICY NUMBER

OCCUPATION

DATE DUE

DAY OF

AMOUNT
PAID ↑

In consideration of the renewal premium paid to the Country Life Insurance Company, the insurance under the policy described above is continued in force for a term of six months from the date shown hereon subject to the terms, provisions, and conditions, of said policy.

See Reverse Side

Date
COUNTERSIGNED

FRIENDLY REMINDER
ONLY A FEW DAYS LEFT!

IF YOUR RENEWAL PREMIUM HAS BEEN SENT, DISREGARD THIS REMINDER.

A FRIENDLY REMINDER THAT THE RENEWAL PREMIUM FOR YOUR ACCIDENT-HEALTH OR HOSPITALIZATION POLICY HAS NOT YET BEEN RECEIVED. IF YOU HAVE NOT ALREADY SENT IT, WE URGE YOU TO MAIL YOUR PREMIUM TODAY TO AVOID LOSS OF YOUR PROTECTION.

PAY PREMIUM TO: **Continental Casualty Company** INTERMEDIATE DIVISION
AT ADDRESS SHOWN ON ENCLOSED ENVELOPE

PREMIUM	
\$	SEND THIS AMOUNT
THIS IS THE LAST DAY	
MO.	DAY YR.

POLICY NUMBER

BE SURE TO RETURN THIS COPY WITH YOUR REMITTANCE

COUNTRY LIFE INSURANCE COMPANY
 43 EAST OHIO STREET • *Chicago 11, Illinois*

STATEMENT OF ACCIDENT INSURANCE PREMIUM

SEMI-ANNUAL
PREMIUM DUE

LESS DIVIDEND

POLICY NUMBER

OCCUPATION

DATE DUE

DAY OF

PAY LAST
AMOUNT ↑

PLEASE RETURN THIS NOTICE WITH YOUR REMITTANCE
IMPORTANT

If there has been any change in your name, address, or occupation, since you applied for your policy, please indicate such change on reverse side.

Lapse Notice - Reinstatement Offer

IF YOUR RENEWAL PREMIUM HAS BEEN SENT, DISREGARD THIS REMINDER.

YOUR DISABILITY POLICY HAS LAPSED:
EVERYTHING YOU POSSESS DEPENDS UPON CONTINUANCE OF YOUR INCOME.

REINSTATE YOUR POLICY NOW AND YOU PROTECT ALL

COMPLETE THE REINSTATEMENT FORM ON BACK, MAIL WITH PREMIUM TODAY.

PAY PREMIUM TO: **Continental Casualty Company** INTERMEDIATE DIVISION
AT ADDRESS SHOWN ON ENCLOSED ENVELOPE

PREMIUM	
\$	SEND THIS AMOUNT
PAST DUE DATE	
MO.	DAY YR.

POLICY NUMBER

THIS NOTICE MUST BE RETURNED WITH YOUR REMITTANCE FOR REINSTATEMENT

Statistics—Research in a Law Enforcement Agency

By Helen E. Dixon

THE statistical organization of the Los Angeles Police Department was a pioneer development in police fields having been established in August 1923. It was the first Metropolitan law enforcement agency to utilize tabulating equipment for the compilation of statistics on crime and criminals.

The flexibility of mechanical tabulation lends itself favorably to the presentation of pertinent data contained in police reports. This permits comprehensive studies into the many-sided police problems.

The consistent growth of the collection of data and the tabulated results has been the history of this installation since its inception, and at the present time every police incident from a murder to a traffic citation for parking, is mechanically processed.

One feature of this system is that it serves a dual purpose. Beside statistical tables, the same cards are used as histories of crimes and criminals, and are constantly being sorted and tabulated into patterns of the methods used in committing crimes and automatically connecting the criminals employing similar methods.

The techniques employed are definitely pointed to the three main objectives of this installation:

1. Presentation of Police Statistical Data
2. Crime Detection
3. Administrative Information to provide basis for long range planning.

Traffic Accidents—Causes by Divisions

MACHINES USED:—IBM Type 405 Accounting Machine equipped with: Two Digit Selectors, Sixteen single X distributors, Four Class Selectors, Pluggable Switches. Type 517 Summary Punch or 513 Reproducer.

TABULATION: The length of the report form would not accommodate the spread of Police Divisions with percentages. Therefore, the information is divided in two parts spreading seven Divisions in the upper half, six Divisions and the Total count in lower half. To avoid wiring two boards, one for each half of the report, the following diagram was set up:

1. Minor Control on Cause of Accident. (Columns 60-61)
2. Card Count entered into Counter Entry of each Counter. (Each card represents one accident.)
3. Units position of Police Division (Column 17) entered into Pick Up of Digit Selector One.
4. Tens positions of Police Division

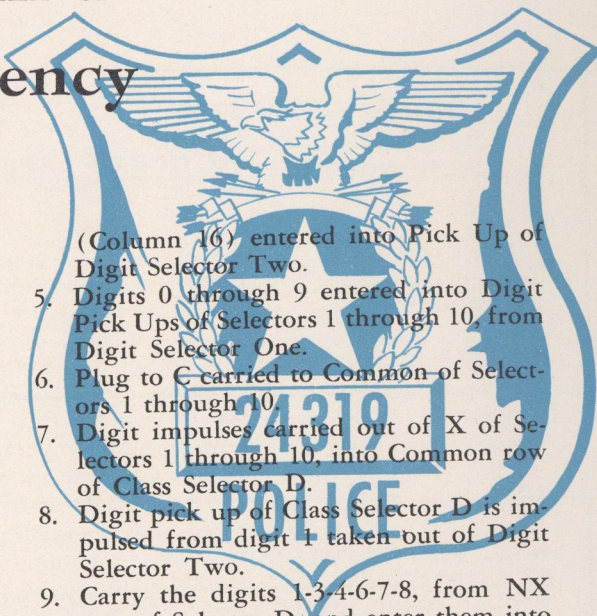
- (Column 16) entered into Pick Up of Digit Selector Two.
5. Digits 0 through 9 entered into Digit Pick Ups of Selectors 1 through 10, from Digit Selector One.
6. Plug to C carried to Common of Selectors 1 through 10.
7. Digit impulses carried out of X of Selectors 1 through 10, into Common row of Class Selector D.
8. Digit pick up of Class Selector D is impulsed from digit 1 taken out of Digit Selector Two.
9. Carry the digits 1-3-4-6-7-8, from NX row of Selector D, and enter them into X row of Class Selector C.
10. Carry digit 9 from NX row of Selector D, into NX row of Selector C to the corresponding position with digit 1 in X row.
11. Carry digits 0-1-2-3-4, from X row of Class Selector D and enter into the NX row of Selector C to corresponding positions with digits 3-4-5-6-7, in X row of same Selector.
12. X 80 is wired to X pick up of Selector 11 through the NX side to NX row of Class Selector C to corresponding position with digit 8 in the X row, for total count, preventing count of X heading cards.
13. Wire from Common row of Class Selector C to the plus hubs of counters which are set up to count specified Divisions.
14. Impulse the X Pick Up of Class Selector C, from the UCI hub which has been taken through a pluggable switch. Wire UCI into common of pluggable switch, out of A to Pick Up of Selector C.

When pluggable switch is set to A, UCI impulse picks up Selector C and digits 01 through 08 are available through controlled points to impulse counters to add for first half of report.

When pluggable switch is set to B, digits 09 through 14 and the Total Count are available through Normal points to impulse counters to add for second half of report.

All cards tabbed through twice setting pluggable switch to indicate which group is counting. Two boards required for Summary punching.

Master copy is tabulated with hectograph duplicating carbon. Percentages are entered after tabulation.



TRAFFIC ACCIDENTS
CAUSES BY DIVISIONS WITH PERCENTAGE

SECTION 3, PAGE...^A.....
MONTH, February..... YEAR, 1952

TYPE.....Street Traffic.....

FATAL.....: PERSONAL INJURY.....: PROPERTY DAMAGE.....: ALL...3

SECTION 3, PAGE...^A.....
MONTH, February..... YEAR, 1952

	CENT.		S. UNIV.		S. HOLBK.		S. SAN PEDRO		S. HOLLYD.		S. WILSHIRE		WEST L.A.	
Drunk Driving - Felony														
Drunk Driving - Misd.	41	13	39	16	15	16	22	18	26	14	27	13	22	14
Speed	19	6	28	11	14	15	25	21	26	14	29	14	27	17
Reckless Driving														
Signal Lights	47	15	32	13	10	11	6	5	14	7	37	18	16	10
Boulevard Stop	6	2	9	4	6	6	4	3	3	2	9	4	3	2
Wrong Side of Street	12	4	6	2	1	1	5	4	1	1	1	1	10	6
Right of Way (Driver)	34	11	43	17	9	10	15	13	28	15	35	17	27	17
Right of Way (Ped.)	14	4	6	2	2	2	3	3	5	3	1	1	8	5
Pedestrian Violating	11	3	9	4	4	4	3	3	3	2	6	3	3	2
Failure to Signal	12	4	7	3	2	2	4	3	4	2	4	2	4	2
Improper Turn	10	3	3	1	2	2	5	4	7	3	9	4	6	4
Following too Closely	23	7	14	6	10	11	3	3	21	11	20	10	9	6
Improper Passing	27	9	17	7	6	7	3	3	21	11	9	4	9	6
Improper Lights														
Defective Brakes														
Other V. C. Violations	57	18	31	13	10	11	18	15	28	15	17	8	15	9
Other M. C. Violations	4	1	2	1	2	2	2	2	2	1	1	1		
TOTAL	317	100	245	100	93	100	118	100	139	100	205	100	159	100

	VALLEY	%	WILM.	%	HIGH PARK	%	77TH STREET	%	NEWTOWN	%	VENICE	%	TOTAL	%
Drunk Driving - Felony	31	12			20	17	31	14	31	16	9	14	314	14
Drunk Driving - Misd.	37	15			27	23	41	18	14	7	13	21	300	14
Speed														
Reckless Driving	17	7			7	6	37	16	8	4	6	9	237	11
Signal Lights	5	2			4	2	4	2	3	2	5	8	65	3
Boulevard Stop	5	2			3	2	5	2	11	6			50	3
Wrong Side of Street	42	17			12	10	39	17	41	22	12	10	336	15
Right of Way (Driver)	3	1			3	3	5	2	9	5	2	3	61	3
Right of Way (Ped.)	12	5			2	2	10	4	13	7	5	8	81	4
Pedestrian Violating	18	7			8	7	4	2	6	3			73	3
Failure to Signal	8	3			3	2	3	1	10	5	2	3	66	3
Improper Turn	21	8			7	6	14	6	7	4	3	5	152	7
Following too Closely	22	9			8	7	8	4	13	7	1	2	144	7
Improper Passing														
Improper Lights														
Defective Brakes														
Other V. C. Violations	25	10			14	12	16	7	21	11	5	8	257	12
Other M. C. Violations	3	1			2	2	5	2	10	5			25	1
TOTAL	250	100			117	100	220	100	189	100	63	100	2173	100

[illegible]

Robbery Modus Operandi Run

	Card Columns	Code
Occupation of Victim: Jeweler	16-18	338
Description of Suspects: Four Caucasians, Male & Female	46-48	154
Trademarks:		
Suspect Rings Doorbell	36-38	127
Carries container for loot	33-35	034
Tortures victim to reveal hiding place	30-32	158
Cards to be selected from ten years of cleared Robbery cases, committed in residences. Selection to be made by IBM Collator, Model 077.		

MACHINE OPERATION:

Selection of cards of specific control number, using both feeds. Finder card in Primary feed. No X required in finder card.

1. Finder card read into the Primary Selector Magnets and the 1st Primary Sequence Magnets, from the Primary Sequence Brushes.

2. Primary Selector Magnets and 1st Primary Sequence Magnets are not restored.

3. Card readings for comparison are read from Primary Brushes to 2nd Primary Sequence Magnets, and from the Secondary Brushes to the Secondary Selector Magnets.

4. Secondary Selector Magnets and 2nd Primary Sequence Magnets are restored on every card cycle.

PRINTED IN U.S.A.  INTERNATIONAL BUSINESS MACHINES CORPORATION FORM 32 9133-4 END 2M PADS-1-46

TYPE 077 COLLATOR CONTROL PANEL

SELECTORS

LOW SEC
EQUAL
LOW PRIMARY
HIGH 2ND PRI
EQUAL 2ND PRI
LOW 2ND PRI

PRI CYCLE DELAY

COUNT
SOURCE IN
P. PRI. T.

OPERATION - Selection with Finder Card
No X in Finder

REMARKS

SEC. SELECT
PRI. SELECT
SEC. FEED
PRI. EJECT
PRI. FEED
ERROR STOP

PRI X
SEC X

BASIC SETUP
MULT. SRS
PRI CHANGE
INTERLOCK

SECONDARY CARDS
PRIMARY CARDS

Finder in Primary Feed

SEL. SECONDARIES	SEPARATE	MERGED	SEL. PRIMARIES
Selected Secondaries	Secondaries Not selected	Primaries No selected	Selected Primaries
SECONDARY BRUSHES			
SECONDARY SELECTOR MAGNETS			
1ST PRIMARY SEQUENCE MAGNETS			
PRIMARY SELECTOR MAGNETS			
PRIMARY BRUSHES			
PRIMARY SEQUENCE BRUSHES			
2ND PRIMARY SEQUENCE MAGNETS			
PRIMARY SEQUENCE BRUSHES			

CTRL INPUT
RESTORING MAG

ELECTROTYPE NUMBERS OF CARDS INVOLVED:

NAME OF CUSTOMER

DEPARTMENT OF CUSTOMER

TITLE OF REPORT

DATE

Mechanization in Public Utility Billing

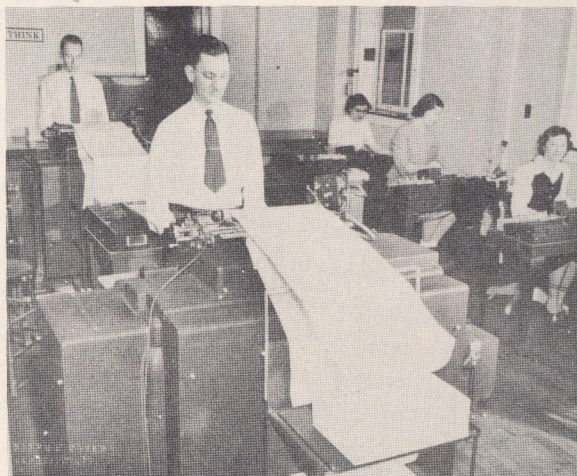
By C. R. GIBBONS

UTILITY BILLING is usually thought of as an automatic or mechanical operation, when in fact there is a considerable amount of manual labor involved. Billing is the cumulative result of a series of time and synchronized operations—beginning with the reading of the customers' meters and subsequently involving calculating proof analysis, addressing, bill printing, and delivery operations. Efficient billing is achieved by scheduling an even flow of work from the reading of meters to the time of bill delivery. Groups of customers' meters are scheduled to be read on certain days and these bills must be prepared and delivered a specific number of days in advance of the scheduled discount or due dates. To effect maximum labor and machine work loads, the work must be distributed evenly throughout the month. This is brought about by reading, billing, and delivering a portion of the bills each day. In this manner, a portion of the bills become due every day, creating an even flow in collecting, posting, and other related work. This is commonly referred to as cycle billing.

Methods of utility billing are receiving much attention from the standpoint of mechanization due to the tremendous number of bills prepared continuously month after month in a steadily increasing volume. Billing an account for a utility is costly because meters located on the customers' premises must be read and billed periodically. The volume of bills, however, makes it possible to establish mass production methods for handling routine operations to speed up the work and eliminate the possibility of errors.

Post Card Bills

Pennsylvania Electric Company, on a monthly billing basis, was making about 4 million meter readings each year and preparing approximately the same number of bills. To keep abreast of the latest mechanical applications for this work, changes have been or are being made in methods of billing. Paper bills and hand delivery were eliminated several years ago and post card bills are now in use. With the inauguration of post card billing, the delivery cost was reduced from approximately $3\frac{1}{4}$ cents for paper bills, to 1 cent (now 2 cents) for post card bills. Bi-monthly meter readings and billing is now being inaugurated for residential and small commercial customers. Machines compute the bills; check for errors; print the customer's name, address, billing data, postage indicia, and advertising on bills; count customers; summarize use and revenue; copy meter reading sheets; prepare meter test sheets; address customer advertising and other matter, and compile many kinds of rate and statistical information.



The post card bill which is printed by The Standard Register Company is prepared in continuous form on IBM equipment. A Standard Register Burster Imprinter imprints the non-metered mail indicia and advertising on the post card bills, cuts off the continuous form's marginal holes, slits the post card bill into its component sections, and then bursts and stacks the bills. All of this work is done in one continuous operation.

The continuous printed bills, meter reading sheets, and other forms, together with the burster imprinter, are responsible for perfect, efficient, and speedy handling of bills. Through the use of controlled continuous forms, perfect alignment and uniform registration are assured. The use of the burster imprinter for printing the postage indicia eliminates the use of other postage affixing equipment and labor.

International Business Machines Corporation accounting machines and cards are the accumulating and printing heart of the Billing Center. These cards, which are printed to conform to the billing and statistical requirement of the company, are machine keypunched according to the information to be tabulated. The accounting machine reads the punched holes and selectively adds, subtracts, accumulates, and prints the desired information. These punched holes further permit sorting, arranging, matching, checking, reproducing, extending, etc. on other machines.

The basic billing records are (a) meter reading sheet, (b) customers' name and address card, (c) billing data card and (d) combination customer's bill, ledger record, and collection copy-final notice.

Four-year meter reading sheets are used and one-

the *Punched*
Card

fourth of the sheets in each district are rewritten each year to spread this work. These are continuous form meter reading sheets and are prepared on IBM accounting machines.

The name and address files comprise one punched card for each customer having thereon (a) customer's name, (b) address, and (c) town.

The billing cards contain all of the information which is necessary for billing, such as district, route, folio, tax district, service, revenue class, rate, due date, previous reading, present reading date, present reading, use KW demand, billing code, and the gross and net amounts.

Story Starts in Districts

The story of the company's Billing Center operations must begin with the fact that the work is performed on a predetermined schedule. This schedule starts with meter reading for all districts on designated days each month so that meter books are received from each district in a continuous flow. It is, therefore, apparent that billing starts in the various district offices. There the meter readers read customers' meters and turn in their books to be reviewed, then packed together with related forms which pertain to changes in the books and sent to the Billing Center. Each meter book is made up on the basis of a day's meter reading. Entries and changes are made by meter readers and district office clerks to record meter readings, changes in rates, account numbers, name, addresses, tax districts, meter numbers, and other essential customer data.

The meter reading books arrive from the district offices by express at the shipping and receiving section of the Billing Center. This Section records the receipt of incoming books and the shipment of outgoing books and finished bills which arrive and depart on a predetermined schedule. The incoming meter books are unpacked, a work record

sheet is prepared and inserted in each book and they are passed on to be processed. Normally, the books are completely processed in about two days.

An audit section receives the meter books. At this point, books and prepunched billing cards meet for comparison. The prepunched cards were prepared prior to billing or were held over from the previous billing period; cards serve for two billing periods. The auditors review each meter reading sheet and compare route, folio, previous reading, demands, and other unusual billing data. Blank cards are inserted for new accounts and cards are removed for customers no longer receiving service. Prorated bills are computed for new customers and cards are inserted. Special and irregular bills (those not covered by master cards) are computed and cards are inserted. All power bills are prepared by the Billing Center. The foregoing work is checked and the advance billing cards are all in route and folio sequence. The cards and related meter books are sent to the keypunch operators.

Checking by Machine

The keypunch operators can take over the job of punching only the present meter reading and kilowatt hours used, on all regular billing cards. Other billing information had previously been automatically reproduced into the card from the previous period's billing cards. The regular meter reading date is later gang-punched in the cards. All billing data inserted by the auditors for prorated and irregular bills are punched on billing cards.

The tabulating cards and meter books are now taken to an automatic checking machine to account for all folio numbers and to prove the accu-

Continued on Page 169

RETURN POSTAGE GUARANTEED

PENNSYLVANIA ELECTRIC COMPANY

OFFICE OF MAILING

For Coder Kitchens

ELECTRIC COOKING

JOHNSTOWN PA

FIRST CLASS MAIL

U. S. POSTAGE

PAID 1-CENT

PERMIT No 59

CAMBRIA CLEARFIELD MINING CO

ST BENEDICT PA

WESTOVER PA

LEDGER RECORD

CAMBRIA CLEARFIELD 1799 MINING CO 63 ST BENEDICT PA

WESTOVER PA

PENNSYLVANIA ELECTRIC COMPANY

FINAL NOTICE

DATE

According to our records, your account for service remains unpaid.

We regret to advise you that unless this amount is paid in full on or before

service at the address shown will be discontinued.

If service is discontinued, it will be restored only after payment in full of the amount due, together with a reconnection charge. A deposit may also be required.

May we receive your payment promptly so that your service will not be interrupted

1791859

PENNSYLVANIA ELECTRIC COMPANY

SERVICE TO NO DAY

NET BILL

BAL

TOTAL

GROSS BILL

MONTH DAY

LAST DAY TO PAY NET BILL

PAYABLE AT ANY COMPANY OFFICE OR AUTHORIZED AGENCY

COLLECTION COPY

1791859

PENNSYLVANIA ELECTRIC COMPANY

RATE GROSS BILL NET BILL

MONTH DAY

AFTER THIS DATE PAY GROSS BILL

CASHIER'S STUB

WHEN PAYING BY MAIL, PLEASE DETACH AND ENCLOSE THIS STUB

COLLECTION COPY

PENNSYLVANIA ELECTRIC COMPANY 1791859

LEDGER RECORD

SERVICE TO NO DAY USED

RATE GROSS BILL NET BILL

BAL

TOTAL

DATE- AMT PAID

DATE- AMT PAID

AMT. OF FORFEITED DISC.

FINAL NOTICE MAILED

DISCONNECT L.W.O. ISSUED

CH-90 REV. 1181

PENNSYLVANIA ELECTRIC COMPANY

SERVICE TO NO DAY

NET BILL

BAL

TOTAL

GROSS BILL

MONTH DAY

LAST DAY TO PAY NET BILL

MY WAGES DO A LOT OF DIFFERENT JOBS FOR YOU!

1791859

PENNSYLVANIA ELECTRIC COMPANY

RATE GROSS BILL NET BILL

MONTH DAY

AFTER THIS DATE PAY GROSS BILL

CASHIER'S STUB

WHEN PAYING BY MAIL, PLEASE DETACH AND ENCLOSE THIS STUB

Machine Accounting Operations

Wesson Oil and Snowdrift,
Bayonne, New Jersey

Sales Analysis

OBJECTIVE—To prepare reports required weekly, monthly and at other intervals by the local office and the Main Office at New Orleans.

Source of Data—

1. Invoices (two types, i.e., "Directs"—shipment direct to customer from Bayonne and "Yellow Bills"—shipments from warehouse consigned stock points).
- 2) Credit Memoranda
- 3) Debit Memoranda
- 4) Cash Book
- 5) Returned Goods Check Slips
- 6) TJ and AJ entries (journals)
- 7) Claims

Electros—No. 540503—Sales Analysis Detail Card and No. 705674—Customer Master Card

General Operation

One card (Sales Analysis Detail) is punched for each item appearing on an invoice (or other

document mentioned above). This card is manually key punched with the exception of Columns 11-28 which are punched automatically (i.e., duplicated) from the Customer Master Card placed in the "duplicating rack" of the Key Punch. The punching of each Sales Analysis detail card is verified. When reports are required the detail cards are automatically sorted and tabulated to prepare data in the sequence required.

Procedure

Receipt of Invoices—Yellow Bills.

Received in the Sales Department, as they are sent in by Consignment Points, where various checking routines are made. An adding machine tape of each batch of invoices (from each consignment point) is prepared by the Sales Department. This tape serves two purposes (a) provides a control total for balancing purposes and (b) provides the Tabulating Department with a control to insure their receiving all invoices sent in by the warehouses. This tape **MUST** include all invoices received. If for any reason an invoice is withheld (these cases are rare exceptions) by the Sales Department, a proper notation must be made opposite the related item on the tape.

Sales Department sends invoices daily to Tabulating Department in groups (with tape attached) by Consignment Points. Tabulating Department checks the tape for missing invoices.

Accounting Department verifies the line extensions and invoice totals. Invoices are added to obtain a control total of the day's business—total pounds, packages and dollars. Totals are entered on Control Sheet which is used by the Tabulating Department for balancing cards punched.

WESSON OIL & SNOWDRIFT SALES CO.
BAYONNE SALES DIVISION

STATEMENT OF COMMISSION
DUE FOR THE MONTH OF: _____

COMMODITY	INVOICE NO.	LBS. BY INVOICE	TOT. COMM. POUNDS
-----------	-------------	-----------------	-------------------

DAILY SALES RECORD REPORT

BAYONNE SALES DIVISION
TERRITORY AND CUSTOMER

DATE _____
COMM. COMM. LBS. TOTAL LBS.

COMM. POINT
WAREHOUSE
LISTING OF
DATE
COMM. INVOICE NO. POUNDS TOT. LBS. DOLLARS TOT. DOLLARS

GROUP	CLASS OF TRADE	INVOICE CLASS	STATE	CITY	ZIP	NAME	PROPRIETOR	ADDRESS	CITY	STATE	GROUP	CLASS OF TRADE	INVOICE 1/2	REMARKS
0000000000	0000000000	0000000000	0000000000	0000000000	0000000000									
1111111111	1111111111	1111111111	1111111111	1111111111	1111111111									
2222222222	2222222222	2222222222	2222222222	2222222222	2222222222									
3333333333	3333333333	3333333333	3333333333	3333333333	3333333333									
4444444444	4444444444	4444444444	4444444444	4444444444	4444444444									
5555555555	5555555555	5555555555	5555555555	5555555555	5555555555									
6666666666	6666666666	6666666666	6666666666	6666666666	6666666666									
7777777777	7777777777	7777777777	7777777777	7777777777	7777777777									
8888888888	8888888888	8888888888	8888888888	8888888888	8888888888									
9999999999	9999999999	9999999999	9999999999	9999999999	9999999999									

18 M. 705674

Directs.

Billing Department forwards invoices to Sales Department for checking of price, etc. When sent to Sales Department, batches of invoices are accompanied by a tape listing showing the amount of invoices included in the batch.

Sales Department forwards invoices daily to the Tabulating Department with the tape listing. Tabulating Department checks the tape to verify that all invoices have been received.

Accounting Department verifies line extensions and invoice totals. Accounting Department checks invoices against Shipping Report to verify that all items shipped have been billed, to verify weights, etc.

Invoices are added to obtain a control total of the day's business—total pounds, packages and dollars. Totals are entered on Control Sheet which is used, in conjunction with the Tabulating Department routines, for balancing purposes.

Key Punching Tabulating Cards

Customer Master Cards. Reading the Customer's name on our invoice, the corresponding Master Card is removed from file and attached to the invoice. One Sales Analysis detail card is punched for each item on invoices (or other source documents) as per Punching Instructions. The placing of the Customer Master Card in the duplicating rack of the key punch effects the AUTOMATIC punching of Customer Number, State, Salesman, etc., in each detail card.

Upon the completion of punching of Sales Detail Cards for the day's business, cards and invoices are turned over to another operator for verification by the Mechanical Verifier.

1. Operator sees that the proper Master Card has been pulled from file.
2. Columns 1 to 10 are sight verified. Since Columns 11 to 28 are duplicated from Master Card, no verification is required.
3. Columns 29 to 33 are sight verified.
4. Columns 38 to 75 are key verified.

Upon completion of the key verification operation, the cards are placed in the Tabulator and tabulated for a total of Pounds, Packages and Money which totals are checked to totals previously posted on Control Sheet.

Cards are filed pending tabulation of Weekly reports. Invoices are transmitted to the Stock Department where they are filed in Warehouse Point and numerical sequence. Before being filed each invoice must have rubber stamp imprints indicating that cards for that invoice have been punched and verified.

Punching Cards from Sources other than Invoices—During the course of the month, entries are made in the following records which affect sales:

Cash Disbursements Book
Petty Cash Book
Allowance Journals (AJ's)
Debit and Credit Memoranda
Claim Summary
General Entry Journal

Reference is made to these records and tab-

ulating cards are punched to complete the punching routine for the month.

Reports

As outlined below, various reports are prepared by the Alphabetic Accounting Machine (tabulator). The routine relating to the sorting and tabulating of the cards for these reports is clearly outlined by notations on Plug-board Diagrams of which there is one for each report prepared on the tabulator.

The following are reports prepared monthly:

Warehouse Recap Sheets—For each Consignment Point, indicating total of Pounds and Dollars for each Commodity.

Town Ledger.

Brokers Commission Statement.

Wesson Oil Packages Report—New York and New Jersey Districts.

Territory Profit and Loss—Pounds and Dollars of Each Commodity for each Territory.

Warehouse Stock Control

At the end of each week, the tabulating cards are sorted and tabulated to provide a posting medium for the Stock Ledger Clerk. One report is prepared for each consignment point and warehouse showing for each commodity and brand, the size of container or packages, the number of packages and the pounds relating to same. These totals are posted as stock disbursements by the Stock Ledger Clerk.

To support the above figures, a "sales listing" is prepared for each warehouse and consignments point to note, as reference data, invoice number, commodity, pounds and dollars of all invoices included in the total posted by the Stock Ledger Clerk.

Punching Instructions for Sales Analysis Detail Cards

Column 1—*Kind of Entry*—Key punched per Codes indicated on card.

2-6—*Invoice Number*—key punched

7-10—*Invoice Date*—key punched

11-18—*Customer Identity Data*—duplicated from Customer Master Card.

19-28—*Customer Location, Territory and Salesman*—duplicated from Master Card.

29-30—*Broker*—key punched, if shown on invoice or, if no broker, punch 99.

31-32—*Ship From*—Normal Warehouse Point—key punch code number corresponding to Warehouse. If shipped from plant direct, punch 99.

33—*Ship From*—Direct Plant Shipment—key punch as per code indicated on card. If shipment made from Normal Warehouse Point—punch a 9 in this column.

34-37—*Contract Number*—X skipped. (Not used).

38-47—*Product Description*—code corresponding to item on invoice is key punched.

- 48-50—*Packages*—Key punch or X skip when not required.
- 51-55—*Pounds or Dozen*—key punch or X skip. Dozen is punched for Shrimp and Oysters—1/12 of a dozen equals .08; 1/4 dozen equals .25; 1/2 dozen equals .50; 3/4 dozen equals .75.
- 56-62—*Price*—key punched.
- 63-68—*Sales Amount of invoice item*—Key punched or X skip.
- 69—*Code*—key punched (0-Product Sale; 1-No Charge; 2-Sample; 3-Introductory allowance). Punch X in this column for credits, i.e.—to secure subtraction of Sales Amount, Pounds and Packages.
- 70—*Order Count*—key punch. Punch 12 for New Customer, 11 order count in first detail card of an invoice only—and zero for spacing in second and subsequent detail cards for the invoice. If nothing further to be punched, eject card.
- 71-74—*Other Debits or Credits*, viz., items not to be included in Sales Amount. Key punch.
- 75—*Code*—Key punch as per codes indicated on cards. Punch X in this column for credits pertaining ONLY to other Debits or Credits.
- 76-80—Use this field to punch X's required Wesson Town Ledger.
- X76—Wesson Oil
- 77—Wesson 1/5's
- 78—Snowdrift
- 79—Bulk Wesson Oil

Accounts Receivable

Outline of Procedure

THE Accounts Receivable Procedure operates more or less parallel with our Sales Analysis Procedure. To insure obtaining the maximum benefit from both procedures, it is essential that the Main Office personnel, and more particularly the Field personnel, be impressed with the importance of proper handling of invoices and credit memoranda and the NECESSITY of transmitting them to the Accounting Department as soon as possible. Invoices should flow immediately and DIRECTLY from the Billing Points to the Accounting Department. Any other extraneous handling, i.e., "detours," borrowing of invoices for special purposes, creates the hazard of lost invoices, errors and delay.

As an additional safeguard of accuracy, all Billing Points, whether at the Main Office or in the Field, should send to the Accounting Department an adding machine tape reflecting a listing and a total of their billing for EACH DAY (those

invoices actually sent to the Accounting Department). Upon receipt of the invoices in the Accounting Department, these are checked off against the tapes to determine if any invoices are missing (after which the invoices are turned over to the Tabulating Department). The Accounting Department also combines Tape Totals to enter the grand total on the Sales and Accounts Receivable Control Sheet maintained by the Tabulating Department.

At this point, it is necessary to stress the importance of the proper and current recording of the Control Sheet. Its purpose is to provide, at all times, a definite tie-in or balance between the punched tabulating cards and the figures recorded in the General Ledger. Daily or at stated periods, the following transactions affecting Accounts Receivable and/or Sales may occur:

Accounts Receivable Debits

Sales Invoices
Journal Vouchers
Cash Book Debits
Miscellaneous Debits

Accounts Receivable Credits

Credit Memoranda
Journal Vouchers
Miscellaneous Credits
Cash—Net Cash
—Discounts Allowed

When the above transactions are picked up, the proper totals must be posted to the Control Sheet to provide a proper balancing medium for the tabulating cards.

In the Tabulating Department, each day's invoices are handled and processed as a unit to facilitate planning of the work, checking for errors, etc. Customer Master Cards are pulled from the Master Card File and are attached to the invoices. The Sales Analysis Detail Cards are key punched and verified. They are then balanced in the process of which, three totals are obtained. These are the Accounts Receivable Debit Amount which is checked to the amount previously recorded on the Control Sheet, Total Sales Amount and Miscellaneous Debit Amount both of which totals are entered on the Control Sheet for future balancing and control purposes.

After the Sales Analysis Cards for the day's invoices are balanced as indicated above, the invoices, with the Customer Master Cards attached are turned over to the Key Punch Operator responsible for the Accounts Receivable Punching Routine in the Tabulating Department. (Note: if, instead of punching Sales Analysis cards first and then Accounts Receivable Cards, it is desired to reverse the sequence, this may be done if circumstances warrant. It may be found practical, depending on the pressure of business and volume, to have the two routines operate simultaneously.)

Punching Accounts Receivable Debit Cards

Sales Invoices. One card is punched for the total amount shown on each invoice. Using the Cus-

Please turn the page

the *Punched Card*

Are Daily Ledger Postings Necessary?

The Provident Trust Company of Philadelphia has done away with the daily posting of Ledgers on all punch card applications. In each of the following the Daily Ledgers are in the form of filed punched cards:

Trust Accounting—Transactions are punched, settled, and journalized daily. They are then filed by account in chronological order. This file is the current Ledger. When a statement is due, the cards are listed. The original is used for the permanent Ledger and a carbon copy sent to the customer as a statement. Occasionally, it is necessary to run a rough draft of the Ledger cards for a particular account, but this is insignificant compared to the work of posting Trust Ledgers on a daily basis.

Investment Ledgers—This file consists of an Account Heading card, behind which is filed a detail card for each investment held in the account. Each day, Investment transactions are filed behind the Investment detail card to which they refer. About once every two years this file is listed for a permanent Ledger and a new starting file is reproduced from the Account Detail file.

General Ledger—The same general system is used for the General Books as for the Trust Accounting. Here the Ledgers are run once a month for the permanent Ledger. The cards are then used for the departmental Expense Analysis.

Christmas Club — The coupons are pre-punched cards containing all punching necessary for Christmas Club Accounting: Each day they are settled and then filed by day only. (See Exhibit) Once a month they are sorted in Account Number order and tabulated by Account Number. At the same time a summary card for each account is punched. There is no Ledger required for this application.

Saving Fund—The Deposit and Withdrawal slips are punch cards. After they have been processed through Tellers and Transit they are marked with the account number and amount and settled. Interest is figured on the IBM 602A, and daily journal is prepared. The cards are then filed by account number. These cards may be listed periodically for a permanent Ledger.

Summary — We have been using this basic system of Ledger writing for about ten years in our Trust work. It has proven so successful that we no longer hesitate doing away with a daily ledger on new applications. The operating advantages in eliminating the daily posting of Ledgers are well worth the effort involved in combating the usual resistance to such a change.

—National Tabulating Management Society, "Punch"

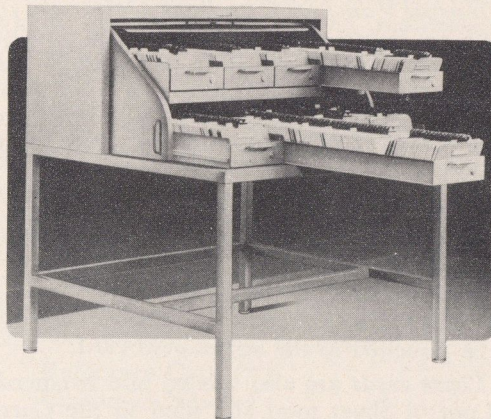
Provident Trust Company OF PHILADELPHIA	3001 21 200 BOOK COUPON COUPON NUMBER NUMBER AMOUNT
"PROVIDENT TRUST COMPANY" OF PHILADELPHIA	
	
CHRISTMAS CLUB	
CHRISTMAS CLUB RECEIVED \$2.00	
DATE	

TOP SPEED IN TABULATING CARD FILING!



1 DIEBOLD'S NEW ELEVATOR FILE

Here is tab card filing at its best! The new Elevator File puts the cards right at the operator's fingertips—and she can refer to any card by simply pressing a button! Yes, electric operation for instant review of over 26,000 cards for review or reference—all in 6 square feet of space! Ask for an immediate demonstration of this new unusual file today at your local Diebold branch.



2 DIEBOLD'S V-LINE TABULATING CARD FILE

Exclusive V-Line operation for fast filing and finding in this Diebold V-Line Desk, especially designed for Tabulating card filing. V-Line rollers and separators speed every reference operation—and drawers move out swiftly and smoothly for quick transfer to machines. See your Diebold branch for complete details on this time saver.

Remember, on every record handling problem—stock control, accounts receivable and payable, personnel, etc. Diebold record handling systems can help you achieve new efficiency.

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Microfilm • Rotary, Vertical and Visible Filing Equipment • Safes, Chests and Vault Doors • Bank Vault Equipment • Burglar Alarms

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tomer Master Card, the Customer Number, State, Territory and Salesman is punched (duplicated) in the debit card relating to a particular invoice. (The Key punch operator verifies that the proper Master Card has been used). Transaction Code, Reference Date, Control Date (used to facilitate balancing to control figures shown on the Control Sheet), and Debit Amount are key punched in the card.

The operator punches the proper AGEING X in the debit card. The punching of this X is important in connection with the printing of the Aged Trial Balance since, by means of it, the Accounting Machine is enabled to segregate amounts as to their status, (Not Due, 1-30 Days Past Due, 30-60 Days Past Due, etc.). Punch tabs are arranged to skip from Column 36 to Age X Column being used for the invoices for a particular month. After the invoice debit cards for the day have been punched, they should be sight verified to see that this X has been properly punched. This X signifies in which month the invoice is Due for Payment. Since the terms are net 30 days, if the invoice is dated in January the February Age X would be punched.

The Cards are tabulated for a total of the day's cards which total is Balanced to the Accounts Receivable total figure shown on the Control Sheet, as previously outlined.

The cards are then sorted to Customer Number sequence and filed behind the proper Tab Cards and Customer Name Card in the Current Accounts Receivable File. Care must be exercised in filing these cards.

Journal Vouchers Cash Book Debits and Miscellaneous Debits. The procedure for punching these transactions is the same as outlined above for Sales Invoices, excepting that a brief Alphabetic Description is punched to facilitate identification of the items, ADJ-JNL, CB DEBIT, MISC DR, etc.

Regarding the punching of the Ageing X, this should be punched in the regular manner, excepting that where the transaction clearly relates to a previous Sales Invoice Debit, then the X punched for that Invoice Debit Card should also be punched in the adjustment card.

These cards are also totaled and balanced to the Control Sheet total and filed in the Current Accounts Receivable File as in the case of Sales Invoice debits. These cards will be differentiated by a Brown Top Stripe - URCC.

Punching of Accounts Receivable Credit Cards

For Credit Memoranda. Cards for Credit Memoranda are punched and handled exactly as outlined for Accounts Receivable Debit. These cards will be differentiated by a Rose Top Stripe URCC. They will contain an X punched in Column 31. This is pre-punched at the factory. The X is important since these cards *SUBTRACT*.

A brief Alphabetic Description, "CR-MEMO" may be punched in the Alphabetic Description Field of the Card.

If the Credit Memorandum clearly refers or applies to some previously issued invoice date, punch the Age X relating or pertaining to that invoice date. However, if there is no reference to a previous invoice, punch the Age X applicable to the Current Month. (If the credit memorandum is dated in January, punch the January Age X).

For Journal Vouchers and Miscellaneous Credits. The procedure for punching and handling these cards is identical with that outlined above. Suitable Alphabetic Description would be "JNL-CR, MISC CR". X will be prepunched in Column 31. Rose Top Stripe—URCC cards are used.

Handling of Cash Remittances

Envelopes containing remittances are turned over to the Cashier or a clerk in the Credit Department who removes the check; the envelope is preserved, stamped with a rubber stamp and the amount of cash received, written in the space provided on the stamp.

A listing of the checks is prepared by the Credit Department, also showing a total amount for the day. The listing, together with the packet of envelopes, is turned over to the Accounting Department. The total amount (Net Cash Received) is recorded on the Control Sheet maintained by the Tabulating Department.

The envelopes are turned over to clerks who refer to the Current Open Accounts Receivable File, to determine how the remittance is to be applied. This procedure is outlined below:

Cash Remittances Affecting Full Payment of Open Invoice Debits

Reading the net cash amount on the envelope, the clerk endeavors to find in the Current File the debit card or cards to which the payment relates.

If the payment refers to one debit card, same is removed from the file and attached to the envelope, after the net cash amount, cash discount, if any, and gross invoice amount have been noted in the spaces provided on the debit card. The envelopes with cards attached are turned over to the Key punch operator who punches in the card the Date Paid, Net Cash Amount, Full Payment X and Cash Discount Amount, if any, this data being read from the notations made on the debit card.

If the payment refers to or liquidates more than one debit card, all are removed from the Current File and attached to the envelope. (If in pulling these cards, the clerk notes that no further open item cards remain behind the Tab index and Customer Name Card, both of these cards are removed from their position in the file and placed in the back end of the file drawer in proper numerical sequence. This has the effect of segregating accounts closed or inactive from the active section of the file and cuts down the time required in running the Monthly Trial Balance. Obviously, when filing new debit cards, if the clerk does not see an Index Card—they will refer first to the

back of the file before having a new Tab and Customer Name Card made up). The Clerk selects the latest debit card and writes on it the net cash amount, cash discount amount, if any, and the gross invoice amount, (total of all the debit cards) and also a list of the invoice dates covered by the payment. All cards are punched with the Date Paid and the Full Payment X—but ONLY the latest debit card is punched for the cash and Discount Amounts.

Pulled debit cards and envelopes are placed to one side pending the handling of cash remittances representing PARTIAL PAYMENTS or CASH ON ACCOUNT as outlined below.

Cash Remittances Representing Cash Received on Account

Any cash received which does not fully or accurately liquidate a debit or debits (taking Cash Discount into consideration) as described above, must be treated as a Cash on Account transaction and a Cash on Account Card (Solid Yellow Color—ULCC) must be punched. These cards and the cards "On Account" punched in Columns 38-44 will contain an X in Column 36 same being pre-punched by IBM at their Factory.

The clerk checking the Current Accounts Receivable File and noting that the cash amount noted on the envelope after considering the discount factor does not exactly liquidate (without the aid of Miscellaneous Debit or Credit adjustment cards) a particular debit, must decide on one of two methods of handling the remittance by Partial Payment or Final Cash on Account.

Partial Payment. This condition will be revealed when a cash remittance (taking discount into consideration) does not exactly liquidate an open INVOICE debit card or cards. The clerk may not be able to determine to what the remittance applies; the customer may have taken excessive cash discount, or may have overpaid an item or items. Again, the INVOICE debit may have an open MISCELLANEOUS debit or credit adjustment associated with it or there may be a previous partial payment card in the file and the new remittance DOES NOT make up the balance due. The clerk takes a blank (unpunched) Cash on Account Card, places a check mark in the Partial Payment Box, writes on the Card Reference Date, Customer Number, etc., in the spaces provided and indicates, if possible, what he believes to be an appropriate Age X. If the appropriate AGE X cannot be decided, use the AGE X pertinent to the current month, if the case is received in January, punch the January AGE X. (He also writes up a Credit Department Advice Form for the Credit Department advising them of the Partial Payment. The Credit Department cannot authorize any adjustments except in the case of cash discounts save through the issuance of Debit or Credit Memoranda or Journal Adjustments.) The partial Payment Card is attached to its related envelope. These are turned over to the Key Punch Operator who punches the cards as follows:

Reference Date (*)

Customer Number
State
Territory
Salesman
Control Date
Credit Amount (Net Cash Amount)
Cash X (Prepunched)
Partial Payment X
Description (ON-ACCT) (Prepunched)
Date Paid (Date Check Received)
Net Cash Amount
Appropriate Age X

*If possible, date of one open invoice debit item to which the partial payment might refer.

The punching is sight verified. Upon completion of the verification, the cards and envelopes are placed with the cards and envelopes mentioned above.

Final Cash on Account

On checking cash remittances to the Current File, the clerk may note that Previous Cash Payments, reflected by previous Partial Payment Cards found in the file, had been received and that now a final payment on account is received WHICH COMPLETELY CLOSES OUT AN ITEM OR ITEMS. Or it may be found that the remittance refers to an open Invoice Debit or debits with which are associated miscellaneous debit or credit adjustments.

The clerk removes from the current file the cards which the new remittance liquidates. These are attached to the envelope. Also attached is a blank (Unpunched) Cash on Account card upon which the clerk has written remittance data (Gross Credit to Accounts Receivable, Net Cash, Discount Amount), Reference Date, if possible, Customer Number, etc.) A check mark is placed in the Final Cash on Account Box, as a signal to the Key Punch Operator. In the space provided, notation is made of all the open items, represented by cards withdrawn from file which the remittance exactly liquidates.

The cards and envelopes are turned over to the Key Punch Operator who punches the Final Cash on Account Card, as follows:

Reference Date (*)
Customer Number
State
Territory
Control Date
Salesman
Credit Amount (Gross Amount)
Credit to Accounts Receivable
Cash X (Prepunched)
Description on Account (Prepunched)
Date Paid (Date Check is Received)
Net Cash Amount
Discount Amount

*If possible, date of one open invoice debit item to which the final payment might refer. The punching is sight verified. Upon completion of the verification, the cards and envelopes are placed with the cards and envelopes mentioned above.

... about the company

In 1951, Wesson Oil & Snowdrift Company, Inc., with headquarters in New Orleans, Louisiana, celebrated the golden anniversary of Snowdrift, its first-born consumer product. Guided by A. Q. Petersen, this company has made tremendous progress as one of the leading manufacturers in its field.

Its gargantuan size is substantiated by the fact that this firm owns 89 cotton gins, 65 crushing mills, 6 refineries, 6 shortening factories, and many miscellaneous physical properties. Wesson Oil & Snowdrift Company, Inc., is a holding company which directly or indirectly owns all capital stock of the Southern Cotton Oil Company, Wesson Oil & Snowdrift Sales Company, the Refuge Cotton Oil Company, South Texas Cotton Oil Company, Blue Plate Foods, Inc., and Southport Paint Company, Inc.

In 1899, through Dr. David Wesson's discovery of a means of deodorizing cottonseed oil by shooting steam through it in a vacuum, and after perfection of a hydrogenation process, Snowdrift made its appearance in U. S. kitchens. As a result, cottonseed oils began to appear in volume in salad dressings, margarines, and other foods. This company can boast as pioneers in presenting the first cookbook, the development of vacuum cans to hold their shortening. The names of Wesson Oil & Snowdrift have become a byword in the American household, bakery, hotel and restaurant field.

filed in the Closed Accounts Receivable File behind proper customer tab cards.

Reports and Statements

Monthly Trial Balance. After the last transaction for the month has been recorded, the cards in the Current File are placed in the Accounting Machine to prepare the Monthly Trial Balance. This Trial Balance will be used to determine if the balance of all the cards in the Current File agrees with the General Ledger Control Total; to provide the Credit Department with the quick status on all accounts which may be checked with established credit limits. Trial Balances will be filed in a proper binder.

Aged Trial Balance—After the regular monthly Trial Balance has been prepared, aged trial balances are prepared for the Credit Department as required, by territories, by salesmen, etc. In certain cases these aged trial balances will be requested twice per month.

Monthly or Periodic Customer Statements—These statements will be prepared as required by the Credit Department. The open items cards are obtained from the Current File. These are combined with Customer Name and Address Cards taken from the statement Name Card File.

Quarterly Customer History Records—These records, one for each customer, are prepared quarterly from cards in the Closed Accounts Receivable File. They reflect transactions in the customer's account for a 3 month period in an arrangement similar to the present ledger sheet and are used by the Credit Department.

Preparation of the Daily Cash Receipts Book

After the cash remittances have been handled, the full paid Debit Cards, Cash on Account Cards, Previous Cash on Account Cards, etc., plus any other cards which may have been pulled from the Current File, are sorted by Customer Number and listed by the Accounting Machine to prepare the Daily Cash Receipts Book. The totals are referred to the Control Sheet—the Discount totals being entered and the Net Cash total being checked with the amount recorded from the Cashier's tape of the envelopes.

Filing of Cards

Removing the cards from the Accounting Machine, the clerk pulls out the Partial Payment Cards that were punched during the day for current remittances. The cards to be selected out can be pulled manually merely by checking the items shown in the Partial Payment Cash column on the Daily Cash Receipts Book. THESE CARDS ARE RETURNED TO THE CURRENT OPEN ACCOUNTS RECEIVABLE FILE AFTER THEY HAVE BEEN PUNCHED WITH A CASH X IN COLUMN 1. Other cards are

... about the authors

In 1939, William Fairlie, after careful study and consideration, undertook the setting up of codes necessary to the installation of IBM punched card equipment in the Bayonne, New Jersey, office. This was to keep pace with the latest type of accounting and statistical procedures in order to facilitate more concise and up-to-date sales and accounting reports through the means of mechanical equipment.

Because of his mechanical and procedural talents, Edward J. Polny was selected to attend various IBM Schools at Endicott, New York, Newark, New Jersey, and Jersey City, New Jersey. This training was with the view toward becoming the supervisor of the tabulating installation at Wesson Oil & Snowdrift. Through his educational background and experience, he has been able to develop some outstanding applications which are used very effectively.

Faster Statements

Continued from Page 31

of the operating statement. Because of the trial-and-error nature inherent in some of the subsequent steps, we had to revise the Chart of Accounts as we went along.

The fact that none of the change-over work could be done in an ivory tower, that we had to keep right on supplying management with monthly operating figures all through the project, led to certain expedient improvisations and compromises. Also, we had to preserve the conventional sources of records or equivalents required by tax authorities and the credit world. Our position was very much like that of a store maintaining business as usual while building alterations are in progress.

Revisions Reduce Costs

Even more gratifying than the fact that we completed all the planning, preparations and revisions in three months was the fact that we managed to do it with no new equipment and a reduction in costs.

Since the ledger is a combination of all the subsidiary books in accounting, and since all subsidiary records are on tabulating cards, a total of 67.8 per cent of all cards used in the ledger entries under the new system have already served a primary purpose in creating collateral records.

To organize the general journal, which represents 32.2 per cent of the total work, we analyzed the old conventional journals and set down all recurring entries in a rational numerical sequence. This enabled us to pre-punch for twelve months in advance those entries of a fixed prorated nature, a job which accounted for only 8.6 per cent of the total work. The remainder of the journal entries are predominantly those on which all necessary data except amounts could be pre-punched twelve months in advance. (The amounts are usually operating figures which can be obtained only after the last day of the month.)

Since the journal card is already prepared, the clerk who gathers the information for the journal entry merely has to write the amount on the corresponding journal card. This facilitates the most rapid type of punching and accounts for 19.6 per cent of the total work.

These facts would indicate that 76.4 per cent of all information in the general ledger is automatically obtained from prepunched sources, 19.6 per cent is partially automatic and only the remaining 4 per cent requires end-of-the-month punching by hand.

All recurring journal entries have the same entry numbers every month. Printed journal entries are numbered in duplicate, with one copy used for punching in the tabulating department and the other retained for control purposes in the accounting department. To supplement the general ledger and statement work schedules, a journal entry progress chart is maintained. This chart provides control over the handling of journal entries through the stages of preparation by clerks,

approval by the accounting department, punching of the cards and their return to an indexed file drawer. The chart tells the status of preparation on the general ledger and the financial statement.

Separate Schedules Formed

In addition to recurring entries, there are regular adjusting and correcting entries, which have another type of number sequence. If they affect a prior month or period, these entries are punched in such a way as to eliminate them from the current operations. Not only do prior period adjustments keep clear of current operations, but they automatically form a separate schedule and act as footnotes to the financial statement.

When the chart indicates that all journal entries are filed, usually about the fourth of the month, the accounting department is then ready to turn over all journal entry cards to the tabulating department for the following automatic listing operations: 1) all journal entries by consecutive journal entry number by debits and credits separately, proving a pre-determined total on the original journal voucher; 2) those journal entries affecting the prior month by account numbers, and 3) all journal entries, including the foregoing, by account number, and by journal entry number.

Having proven the journal entry totals in those schedules, we are now ready to turn over the remaining cards which have been automatically produced through separate distribution proof runs of accounts payable, payroll, etc., in order that the cards be sorted by account number for the general ledger tabulation.

Tabulated so that it totals by assets, liabilities, income, cost of sales and major categories of expense, the general ledger is sorted and tabulated in another 2½-hour period. Obviously, the totalling arrangement allows for immediate determination of the profits by the difference between assets and liabilities, yet this is accomplished in such a way that the confidential nature of such profit information is not disclosed in the tabulating department. With the profit known along with the total sales figures, the Comptroller's office is able to make approximate estimates as to the figures in relation to the break-even point as established in the budget.

Serves as Trial Balance

By the time it is finished, we know immediately whether or not it is in balance, for it serves the same purpose as a trial balance. If it is out of line, we can track down the difference in a matter of minutes by subtotal checks or simple machine operations. One major advantage is that all erroneous or unauthorized account numbers are mechanically caught, and the improper cards are ejected from the machine for correction or approval before the general ledger is run. Once the general ledger is completed, it takes only two hours for the same cards to be re-sorted and the financial statement created.

—“SYSTEMS
for modern management”

Carbon Extraction

By Max Clarkson,
Clarkson Press, Inc.

ONE OF THE MANY PROBLEMS confronting the tabulating supervisor is that of carbon extraction. With the ever growing volume of printed paper that can be processed daily by electric accounting machines, this problem becomes increasingly important and its correct solution is vital to the success of any well operated tabulating department. Much time is spent on the design of a form, but rarely is the problem of carbon extraction considered in relation to the nature and function of the form. Carbon paper tends to be regarded as a necessary evil, necessary for the transfer of the record from one part to another, evil as a result of the operating difficulties which it oftens occasions. With the mechanization of almost every operation in the tabulating room, carbon extraction still remains in many cases a manual and slow process. Except where there is large volume it is not practical, because of the expense involved, to use specially designed automatic carbon extracting machines. A substantial volume is also required to justify the expense and set-up time involved in using even a gravity decollator. Thus the medium-sized or small tabulating installation must rely on one of the methods of manual carbon extraction.

Manual Carbon Extraction

The scope of this article, therefore, will be restricted to a consideration of the more usual methods of carbon extraction as they apply to the supervisor of the small or medium sized installation who is running a variety of forms of moderate or small volume in a variety of depths and widths.

The introduction of marginally continuous forms over 25 years ago presented a major problem in carbon extraction. Up to that time, the standard method of removing carbon from continuous forms used on typewriters and billing machines had been to offset the carbon laterally from the printed forms, so that half an inch or so of carbon protruded at one side. This strip could be grasped and pulled away by one hand while the other hand held the opposite edge of the forms, which were free of carbon. This method obviously could not be adapted to linehole punched feeding margins. However, the principle of a protruding edge of carbon, matched at the opposite side of the paper by an area free of carbon, was still as valid as it had been ever since the first typist discovered that it was the solution to her problem of removing the carbon from between her letter and its copies. From this basic principle were developed the two most popular methods of manual carbon extraction—the half-moon or tongue and the corner tab (Fig. 1). When a set or a strip of forms and carbons have

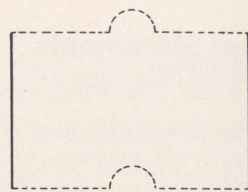


FIG. 1

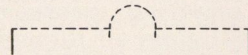
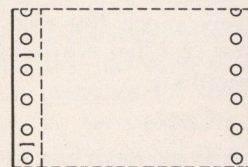
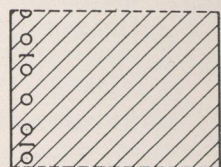


FIG. 2

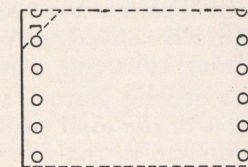


(a) Paper Sheets

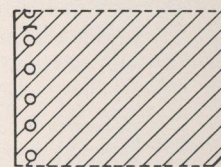


(b) Carbon Sheets

FIG. 3



(a) Paper Sheets



(b) Carbon Sheets

FIG. 4

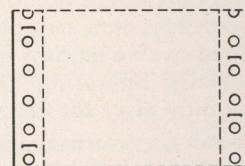


FIG. 5

FIG. 6



FIG. 7

been detached from the pack, the piece of carbon protruding beyond the line of perforation is matched by a corresponding area free of carbon at the opposite end. The width and depth of the tongue, the angle and depth of the tab have gone through various degrees of experimentation and change as each manufacturer has tried to obtain the best results. At Clarkson Press, where we manufacture only marginally punched forms, the results of our specialized research in this field have shown that on a carbon sheet 7" or under the half-moon tongue should be $2\frac{1}{8}$ " wide and $\frac{5}{8}$ " deep at its maximum (for narrower sheets of carbon we use a proportionally narrower and less deep tongue) and that the corner tab, regardless of the width of the carbon, should be $1\text{-}\frac{3}{16}$ " along the straight edge and $1\frac{1}{2}$ " along the diagonal edge.

Methods Reservations

Certain reservations must be made about both methods. In sets of 6 or more parts, the tongue, with its broad base situated in the middle of the sheet, will not tear off, when the sets are separated, as easily as the corner tab. In order to reduce the risk of this tearing off at the moment of separation, the lines of perforation forming the tongue or tab cross the horizontal lines of perforation in the carbon. (Fig. 2). But obviously, if the sets are separated from the rest of the pack simply by tearing straight across the lines of perforation the tongues or tabs will be torn off, no matter what precautions are taken. The proper motion for separating sets is to start to tear across the lines of perforation and then, when the tear has got almost to the tongue or tab, to snap the set forward.

An obvious disadvantage of the tongue arises when it is desired to print and have copies made in the area covered by the tongue, i.e. within $\frac{5}{8}$ " of the top or bottom of the form, depending on whether the tongue is to protrude at the top or bottom. Obviously, at the beginning or end of each package of forms there will be a gap. This disadvantage occurs particularly with stock forms and with forms of $5\frac{1}{2}$ " or less in depth. With the corner tab this problem does not occur. For this reason, at Clarkson Press, all our stock form carbon has corner tabs, unless a specific request is made for a tongue.

Thus, with reference to the tongue and the tab, we reach certain conclusions:

1) For forms up to 5 parts, more than $5\frac{1}{2}$ " in depth, and on which nothing will be printed within $\frac{5}{8}$ " of the top or bottom, either the tongue or tab can be used.

2) For forms of 6 parts or more, with the same reservations as in (1) above, the tongue is preferable.

3) For stock forms and for forms $5\frac{1}{2}$ " or less in depth, the corner tab should definitely be used.

Stapling

We must now consider the staple with respect to carbon extraction. There has been, and probably will be, considerable discussion, especially between competing forms salesmen, about the

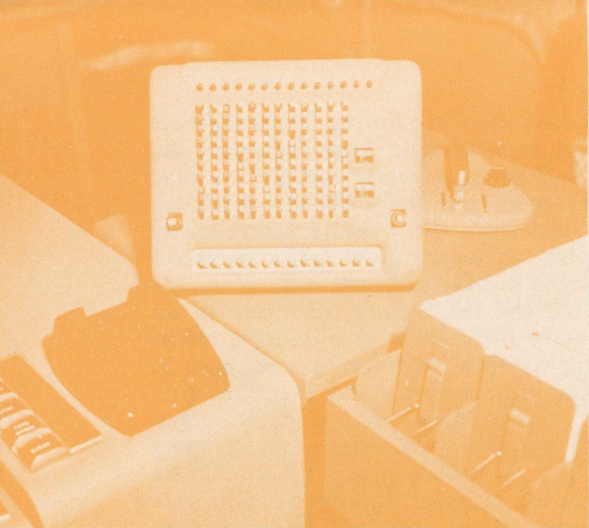
necessity or desirability of stapling forms together in order to insure satisfactory operation over the tabulator. Some manufacturers, and we are one, maintain that quality forms, carefully produced and strictly inspected, will operate satisfactorily without staples, no matter how many parts are in a set. But the satisfactory operation of a 7 or 8 part set, like the satisfactory operation of an automobile at 70 or 80 mph, is a delicate affair. If your going to drive that fast, you're wise to take out extra life insurance and invest in life-guard tubes; you've undoubtedly got good tires, but you can't tell what will happen. And many a purchaser of a multipart form set feels that he likes the extra insurance of a staple to make sure that the operation of the forms will be satisfactory no matter what happens. Regardless of this argument, however, there is no doubt that staples can be used to great advantage in carbon extraction—and if they provide insurance at the same time, so much the better.

The two most widely used methods of carbon extraction incorporating staples are (1) the side staple and narrow carbon and (2) the corner staple. In the first method, the paper sheets are perforated down one margin and one, or preferably two staples, are clinched through this margin (Fig. 3a). The carbon, which has no vertical marginal perforation, is one-half inch narrower than the paper, and is marginally punched only on the stapled side (Fig. 3b). Thus there is space at the right side of the form where the paper only can be grasped, while at the left side the carbons are firmly held by the stapled marginal strip. By snapping off this marginal strip, the carbon sheets are pulled away, leaving the decollated forms in the other hand. The smaller the depth of the form, the better this method works. It is obviously much easier to snap apart a form $3\frac{2}{3}$ " deep than one 11" deep. However, the ease of operation of this method diminishes with the number of parts in the set.

The corner staple method also works on the snap-out principle. The top corner, either left or right, of each sheet of paper is perforated diagonally (Fig. 4a). The opposite bottom corner of the carbon paper is either die cut or tabbed, so that when a set has been detached from the pack a carbon free space is left for the fingers (Fig. 4b). Thus, with a staple through all parts within the diagonal perforation of the paper at the top and with a carbon free space at the bottom, it is a simple matter to extract the carbon sheets by snapping out the perforated top corner. This method will work well with forms of any depth, although the greater width of the form, the less effective it is. We have one very satisfactory operation of this type using a 9 part form with 8 carbons, $8\frac{1}{2}$ " wide and 11" deep. With every inch or so of increased width, however, one part of paper and carbon would have to be omitted. We would not recommend this method for more than 4 parts on a $14\frac{7}{8}$ " x 11" form. An obvious disadvantage of this method is the mutilation of the paper sheets which are left without one corner.

The stapled carbon extraction methods be-

Continued on Page 159



Cardatype – An Aid in the Preparation of Original Documents

By Frank H. Beill, Manager
Tabulating Department
Cadillac Motor Car Company
Detroit, Michigan

The Cardatype

In any record-keeping system, the preparation of original documents is a vital necessity. When the volume of documents to be prepared is small, the general practice is to prepare them by hand or by manually operated typewriters. When the volume is sufficiently large to warrant installation of new accounting machines, the preparation of original documents becomes to a large extent an automatic operation. Between these two extremes, however, there are numerous instances where the volume is too great to prepare documents efficiently under a manual system and yet too small to justify automatic machinery.

The Cardatype is especially designed to fill this gap. It utilizes the punched card principle to perform repetitive operations inherent in any record-keeping system and at the same time reduces the manual operations to a minimum.

The Cardatype is completely flexible. It prints, by means of two document writers, information that is obtained from a punched card, an auxiliary keyboard, or from the manual operation of the document writer keyboards. At the same time, information from the card or auxiliary keyboard, but not from the document writers, may be recorded in a transmittal tape by means of punched holes.

All functions of the machine are directed from a program tape, which is inserted in the program unit, and a control panel. Both the program tape and the control panel wiring may be readily changed to meet specific requirements, although in most cases it is necessary to change only the program tape. The machine offers a quick, automatic, and economical method of preparing such documents as invoices, insurance policy renewals, bills of material, manufacturing specifications, or orders on the primary document writer; while at the same time, tags, labels, registers, material requisitions, job tickets, or any other supplementary documents may be prepared on the secondary document writer.

Printing from punched cards or from the auxiliary keyboard may be interrupted at any time to allow manual operation of either document writer keyboard.

The Cardatype operates at a speed of 600 characters per minute. The actual number of

characters that can be written in one minute, however, depends on the number of stops, skips, carriage returns, etc., that may be necessary. More than one line may be written from one card, or one line may be written from several cards.

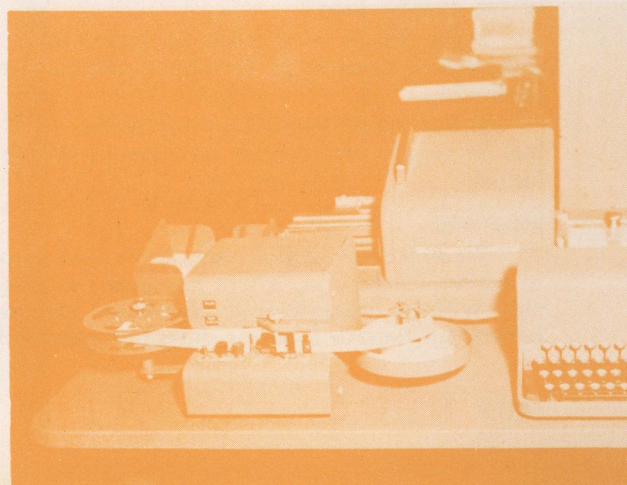
Cards may be inserted in the card read hopper one at a time or in packs of 20 or less.

The Cardatype may be adapted to many different applications not necessarily confined to document preparation. The greatest field lies in applications that require repetitive use of the same item of information. The information, once recorded in a punched card, can be used repeatedly as often as necessary. The only attention required from the operator is the insertion and removal of cards and document forms. Data punched in a card are automatically printed by the Cardatype. Variable data may be set up in an auxiliary keyboard or manually typed at any time and on any line at the will of the operator.

The Cardatype consists of five basic units:

- Typewriter 1.
- Program Tape.
- Transmittal Tape.
- Auxiliary Keyboard.
- Typewriter 2.

Editor's Note: Realizing that the cardatype is playing an important part in the preparation of original documents such as invoicing, parts ordering, etc., research is now being made in order that an article embracing the cardatype will be presented in the next issue of "The Punched Card."



Tabulating for Public Safety...

—City of Philadelphia

THE NEW PUNCHED CARD SYSTEM speeding the handling of Traffic violations and enabling magistrates to mete out severe punishments to frequent and flagrant violators was installed in February, 1950. After some 9 months of study of alternatives and development-work on the problem, Punched Card Accounting was accepted as a practical solution.

A valuable by-product of this Punched Card work lies in the statistical studies which are being tabulated to advance the City-wide selective traffic enforcement measures.

It is proposed to broaden this modern police administrative application to include the preparation of Warrant notices, Dispositions and Accident and Fatality studies to further emphasize selective traffic safety measures. In time, this application will provide a sound basis for a Police central records division; covering the maintenance of operator's name file for the ferreting out of willful "repeaters" in traffic law violations; criminal and investigatory records, and allied administrative records for police personnel and police communications.

Other cities are using Punched Card Accounting; this plan goes farther. Philadelphia is the only city sending out tabulated Registered Mail Affidavit Summons to traffic violators and it has proven to be as well a means of speed, accuracy, and income to the City.

The unique features of the system are:

1. Key punching is reduced to a minimum through the utilization of the Master Control Card in creating the Name and Violation Cards automatically by match multi-controlled reproduction.

2. Six lines of printing are obtained from two tabulating cards.

3. The Dating Device on the tabulator is set to print from a single position in the Violation card, two different dates up to a maximum of 21 digits, to cover the Affidavit Swearing and Hearing Dates.

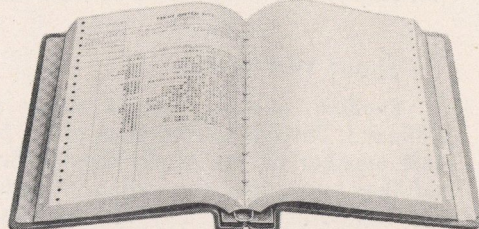
4. The Summons number appearing on the face of the Affidavit is utilized through the window envelope as a registered Mail number by the U. S. Post Office Department.

—National Tabulating Management Society,
"Punch"

FOR EVERY

Marginal Punched Form
... THE NEW
Closed Back Binder!

This new type Thin Prong Binder will hold marginal punched forms without repunching. Sheets can be removed or inserted without disturbing other contents. Opens easily and locks automatically. More convenient than the post type.



We also supply post binders for current and transfer work. Send for our new Catalog "L", showing equipment for marginal punched forms.



Sheppard CO.
THE C. E. SHEPPARD CO.
4401 TWENTY-FIRST STREET LONG ISLAND CITY, N.Y.

Yearly Inventory

By William J. Buttner

INVENTORY CARDS are received from manufacturer with Serial number punched in cards.

A Recap sheet for all cards delivered to factory units is set up, showing serial number of cards issued. Upon completion of inventory, both used and unused cards are returned and checked back to recap.

First punching of cards consists of Part number and Quantity. These are verified mechanically. When punching is completed and verified, each factory unit is sorted separately by Part Number. Listing is made on printer showing Serial number, Part number and Quantity. These listings are turned over to Production Control for checking and adjusting of records. New cards are then turned over to Factory Cost Division, where they are scrutinized to determine which cards can be returned to Tabulating Section for Collating and Gang punching of Prices. All other cards for which Tabulating does not have Master Price

Cards, are priced manually.

Detail cards that can be Interspersed Gang punched are sorted by Part number and collated with Master Price Cards. Cards are then Gang punched with Copper Content, Material, Labor and Overhead Prices, and compared on Part numbers. Master cards are sorted out and detail cards are now ready for Calculating Punch. All other cards are punched and verified manually.

Cards are multiplied on Calculating Punch. Results of Material, Labor and Overhead, times Quantity, is punched by this calculation. Cards are verified on Calculating Punch, reversing multiplier and multiplicand, punching either correct or incorrect designation.

Cards are sorted by serial number to separate each factory unit. Each unit is sorted by Class and tabulated indicating and totalling Class, Material, Labor and Overhead. Cards and Tabulations are delivered to Factory Accounting Division.

[illegible]

QUANTITY		INVENTORY		INVENTORY		ACCT. NO.	
PART NO. OR CAT. NO.		CLASS	C.O. PER M.	MAT. PER M.	LABOR PER M.	SOL. PER M.	
EXTENSIONS		CLASS		COPPER CONTENT	PEN M.	PART NO. OR CAT. NO.	
SERIAL NO.	MATERIAL	LABOR	OVERHEAD	CLASS	MATERIAL	LABOR	OVERHEAD
CRED NO.		RAW	☐	PARTLY WROUGHT	☐	PACKAGES	☐
DEPT.		PART NO. CATALOG NO.	DESCRIPTION		QUANTITY INVENTORIED		NO. OF CONTAINERS
BIF. LOCATION		DESCRIPTION		PER		OPERATIONS COMPLETED	
CLASS		PLAIN	☐	GASKING	☐	DRUMS	☐
VALUE PER M.		EXTENSION		INVENTORY		OBSCOLESCENCE	
COPPER CONTENT		LABOR		INVENTORY		INVENTORY	
MATERIAL		LABOR		TRUMBULL WORKS OR WAREHOUSE		CLASSIFICATION	
LABOR		LABOR		LABOR		LABOR	
OVERHEAD		OVERHEAD		OVERHEAD		OVERHEAD	

... about the author

Reading like a Horatio Alger story, William J. Buttner worked from office boy to staff member of the Motor Service Section and then went into accounting. Graduated into Tabulating work and was for over ten years a supervisor in this field. Later advanced to payroll supervisor and in 1941 went with Trumbull Electric Company as supervisor of that installation. Without question Mr. Buttner has a varied experience in the overall operations that are related to Machine Accounting.

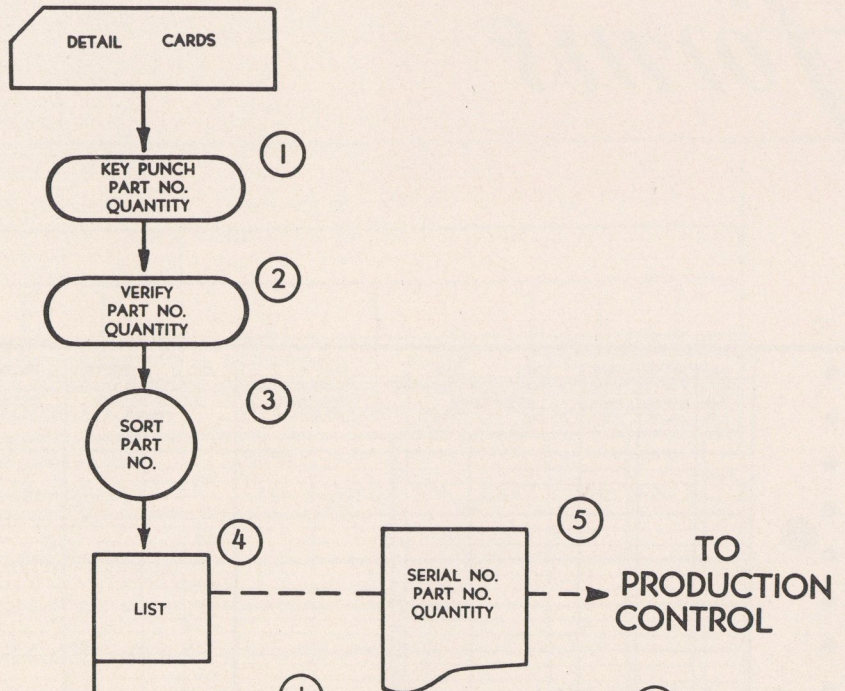
... about the company

Trumbull Electric Manufacturing Company is a General Electric affiliate. Trumbull Electric provides low voltage electrical controls and distribution equipment. Its products include safety switches, circuit breakers, service equipment, motor control equipment, lugs and fuse clamps, panel boards, motor control centers and feeder distribution systems.

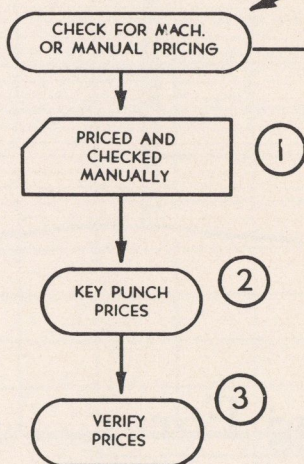
The main plant is located at Plainville, Connecticut, and has a combined manufacturing space of 382,409 square feet. In addition to manufacturing facilities, this area houses a complete engineering department with research and development facilities, a testing laboratory and drafting department.

PROCEDURES FOR YEARLY INVENTORY

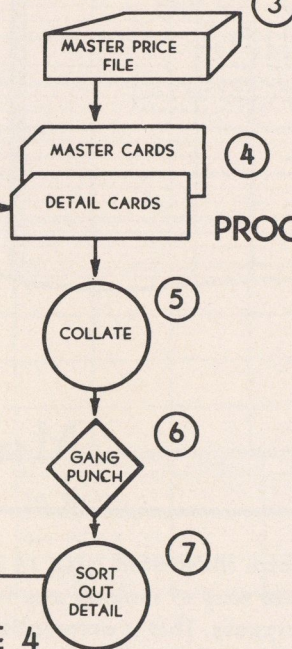
PROCEDURE 1



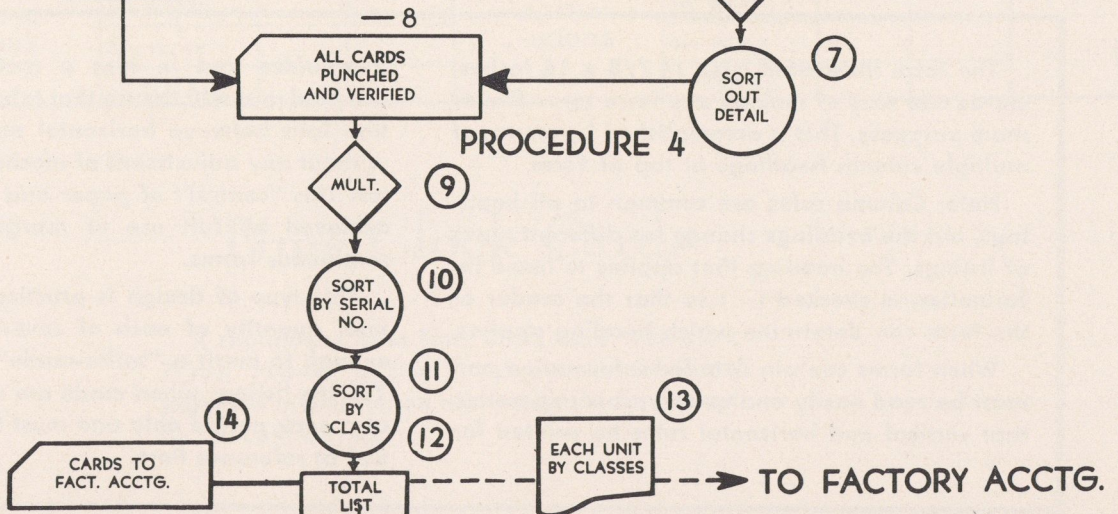
PROCEDURE 2



PROCEDURE 3



PROCEDURE 4



[illegible]

Multiple Heading Form

The form illustrated (size 14 7/8 x 16 inches) shows one way of making one form serve five or more purposes. This is accomplished by means of multiple column headings at top of form.

Note: Column rules are common to all headings, but the headings change for different types of listings. The heading that applies to listed information is checked () so that the reader of the form can determine which heading applies.

When forms contain detailed information and must be read easily and quickly, it is imperative that vertical and horizontal rules be printed for

eye-guides and in turn a method of writing adopted that will assure that tabulating information falls between horizontal and vertical rules without any adjustment of mechanism by operator. This "control" of paper and printing can be achieved by full use of marginally-controlled continuous forms.

This type of design is practical when the annual quantity of each of several forms is not enough to merit a "tailor-made" form for each. Yet, the listings when made are run continuously at a peak period only and must be easily identified at reference time.

NAME								NAME							
CLOCK NO.		DEPT.		MO. DAY YR. PERIOD ENDING		CLOCK NO.		DEPT.		MO. DAY YR. PERIOD ENDING					
INTERWOVEN STOCKING COMPANY								INTERWOVEN STOCKING COMPANY							
DAY	MORNING IN	NOON OUT	NOON IN	NIGHT OUT	EXTRA IN	EXTRA OUT	TOTAL	DAY	MORNING IN	NOON OUT	NOON IN	NIGHT OUT	EXTRA IN	EXTRA OUT	TOTAL
SUN.								SUN.							
MON.								MON.							
TUES.								TUES.							
WED.								WED.							
THR.								THR.							
FRI.								FRI.							
SAT.								SAT.							
SUN.								SUN.							
MON.								MON.							
TUES.								TUES.							
WED.								WED.							
THR.								THR.							
FRI.								FRI.							
SAT.								SAT.							
ACTUAL HOURS				REG		O. T.		ACTUAL HOURS				REG		O. T.	
		1st WEEK				1st WEEK									
		2nd WEEK				2nd WEEK									
		TOTAL				TOTAL									

Time Clock Cards

A continuous form Time Clock Card (size 8½ x 7) run "two-up" so that two pay period cards are provided in one run on tabulating. Accomplished by "double wiring."

Designing Stub Inventory Card Forms

STUB INVENTORY CARDS should be designed with careful thought given to the making out of the cards in the shop. The design should be such that the space allotted for the manual entry of the items and the information pertaining to those items, is arranged in such a manner that no confusion will be encountered by the person entering the data. Spaces for the hand-entered data should be as large as possible.

The card shown in Exhibit 1 is an example of an Inventory Stub Card. In designing it little thought was given to the matter of use of this card in the shop. It is apparent that it is necessary for the person entering the data to skip around on the card in order to locate the proper fields. Then, too, the sequence of the headings on the stub is different from the sequence of the heading on the card itself. Such arrangements cause errors and reduce the efficiency of the inventory clerks.

Exhibit 2 was designed as a result of sugges-

tions made after the card shown in Exhibit 1 was used in the shop. Note the arrangement and size of the various fields.

- 1. A natural writing sequence is established.
- 2. The stub is designed so that the headings are directly opposite the headings on the cards.
- 3. The headings themselves are more concise thereby eliminating any guesswork on the part of the Inventory Clerk.
- 4. A heavy black line is drawn around the fields which do not concern the men in the shop but are used only when entering the costing information.

A card as shown in Exhibit 2 definitely reduces the time required to take inventory. Figures can be entered on the card so boldly that errors will not be made in reading them. Another good feature is that all extraneous items are eliminated—only necessary headings are provided.

TAG No. 40177		TAG No. 40177		INVENTORY	
NUMBER 1289		NUMBER 1289		DESCRIPTION Drill Press	
DEPT. Drill Press		DEPT.		KIND OF MATERIAL Finished Machine	
LOCATION		LOCATION 1st floor bldg C		LAST OPERATION 929-10 Milling Table	
QUANTITY 152		COUNTED BY E.J. Moore		CHECKED BY G.P. South	
COUNTED BY E.J. Moore		PRICED BY J.T. Price		EXTENDED BY W.O.R.	
CHECKED BY G.P. South		QUANTITY 152		UNIT COST	
				MATERIAL LABOR OVERHEAD	
				EXTENDED COST	
				MATERIAL LABOR OVERHEAD	
				LABOR COST OVERHEAD	
				46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90	

Exhibit 1

TAG No. 40177		TAG No. 40177		INVENTORY	
NUMBER 1289		NUMBER 1289		DESCRIPTION Drill Press	
QUANTITY 152		QUANTITY 152		NUMBER OF LAST OPERATION COMPLETED 929-10	
				CONDITION GOOD SLOW OBSOLETE	
				✓	
				UNIT COST	
				MATERIAL LABOR	
				MACHINING ASSEM. & PACKING	
				EXTENDED COST	
				MATERIAL LABOR	
				MACHINING ASSEM. & PACKING	
				46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90	

Exhibit 2

Tab Card Is Parts Tag

TO EXPEDITE the selection or "picking" of stock through the medium of tabulating cards, the following problem presented itself:

Before a tabulating card picking tag was devised, a continuous form tag was used for this operation. This type of continuous tag was rather an expensive one. When compared with the new type, it was expensive not only from forms cost, but in the amount of time that was consumed in punching cards and listing these cards on continuous forms through the use of the 405 tabulator. In addition to this, because of the rough handling of these tags, the durability of the continuous form was questioned.

Since we already have a punch card for each item ordered by the customer, we merely reproduce the stock identification information from this punch card into a tabulating card picking

tag. These tags are reproduced through the use of the I.B.M. reproducer, using an especially designed card form.

Through these changes, we can now reproduce picking tags at the rate of 100 per minute, this, of course, is reduced to some degree to 60 cards per minute due to the speed of the alphabetical interpreter. The picking tag has three large holes punched in the middle of the right hand side of the card. These holes are 3/16 inch in diameter. When the cards are ordered from the factory, two check creases are made on the right hand side of these cards. Through these creases, we are able to fold the tag and thus reinforce the punch hole arrangement three times. This thickness of the tag has been found very strong and durable and we have found it easier to use when attaching or stapling them to the merchandise selected.

202 D	01154035	BRACE	1	20848	7200
SECTION	SHELF NUMBER	PART NUMBER	DESCRIPTION	ORDERED	INVOICE NO.
FROM			BACK ORDERED	PICKERS NO.	
LOUIS ROSE PARTS DIVISION			IMPORTANT		
450 AMSTERDAM AT CASS			ALL CLAIMS FOR SHORTAGES MUST BE MADE WITHIN 5 DAYS. NO MERCHANDISE TO BE RETURNED WITHOUT OUR CONSENT.		
DETROIT 2, MICH.			THANK YOU		
COMPLETE LINE					
					
FACTORY ENGINEERED AND INSPECTED PARTS					
TRINITY 2-1700					

2144 E	01151919	MLOG	2	20848	7200
SECTION	SHELF NUMBER	PART NUMBER	DESCRIPTION	ORDERED	INVOICE NO.
FROM			BACK ORDERED	PICKERS NO.	
LOUIS ROSE PARTS DIVISION			IMPORTANT		
450 AMSTERDAM AT CASS			ALL CLAIMS FOR SHORTAGES MUST BE MADE WITHIN 5 DAYS. NO MERCHANDISE TO BE RETURNED WITHOUT OUR CONSENT.		
DETROIT 2, MICH.			THANK YOU		
COMPLETE LINE					
					
FACTORY ENGINEERED AND INSPECTED PARTS					
TRINITY 2-1700					

IBM 145936

Preprinted Invoice Amount

When one publisher produces several newspapers or periodicals and renewal subscriptions are taken by mail, it is possible to preprint the several publications and combinations as shown on this Invoice and "code" the one for which In-

voice is rendered.

Invoices are sent to subscriber in duplicate so that the subscriber can return one with remittance to insure proper credit. The form size is 5¾ by 6½ inches.

THE MORNING CALL

SUNDAY CALL-CHRONICLE

EVENING CHRONICLE

CALL-CHRONICLE NEWSPAPERS

SIXTH AND LINDEN STREETS, ALLENTOWN, PENNA.

CHARLES H BAILEY

R F D 1

KUTZTOWN PA

YOUR
SUBSCRIPTION
EXPIRES

OCT

22 1947

1
CODE

47183
ACCOUNT NO.

PLEASE
SEND IN
YOUR
REMITTANCE
AT ONCE IN
ORDER TO
AVOID
ANY
INTERRUPTION
OF
SERVICE

1

THIS INVOICE IS RENDERED IN DUPLICATE. PLEASE RETAIN #2 FOR YOUR RECORDS AND RETURN #1 WITH YOUR PAYMENT TO INSURE PROPER CREDIT TO YOUR ACCOUNT.

Subscribers in Pennsylvania being served by mail may deduct the cost of money order or check when making their remittance.

C-48

CHOOSE THE TERM AND AMOUNT YOU WISH TO PAY		THREE MONTHS	SIX MONTHS	ONE YEAR
1	Morning Call	2.34	4.68	9.36
2	Sunday Call-Chronicle	.65	1.30	2.60
3	Morning Call and Sunday Call-Chronicle	2.99	5.98	11.96
4	Evening Chronicle	2.34	4.68	9.36
5	Evening Chronicle and Sunday Call-Chronicle	2.99	5.98	11.96
6	Morning Call and Evening Chronicle	4.68	9.36	18.72
7	Morning Call, Evening Chronicle, and Sunday Call-Chronicle	5.33	10.66	21.32

\$

THE MORNING CALL

CALL

SIX

C

R

K

YOUR
SUBSCRIPTION
EXPIRES

OCT

22 1947

PLEASE
SEND IN
YOUR
REMITTANCE
AT ONCE IN
ORDER TO
AVOID
ANY
INTERRUPTION
OF
SERVICE

1
C 2
O 3
D 4
E 5
7

2

THIS INVOICE IS RENDERED IN DUPLICATE. PLEASE RETAIN #2 FOR YOUR RECORDS AND RETURN #1 WITH YOUR PAYMENT TO INSURE PROPER CREDIT TO YOUR ACCOUNT.

Subscribers in Pennsylvania being served by mail may deduct the cost of money order or check when making their remittance.

C-48

F NATIONAL BANK TON E'S PAYROLL RY CHECK  COUNTERSIGNED EXACTLY RS AND CENTS AMOUNT OF CHECK RE THAN TWO HUNDRED (\$250.00) DOLLARS	CHECK NUMBER X XXX PRES. TREAS. CASHIER 100M-4-45
--	--

Numerical Sorting

One of the most tedious tasks in modern business is "hand sorting."

If any one factor more than another makes this job difficult and permits a margin of error, it is that of "eye-selection" in sorting by number when the number runs over three digits.

The use of identifying symbols or markers under alternate digits facilitates hand sorting appreciably.

On each sort the eye automatically selects the

figure bearing a distinguishing marking or the figure bearing no distinguishing marking, depending on the column being sorted.

This idea can be expanded to an almost unlimited range of possibilities.

Examples:

Columns can be numbered **3 7 0 2**
4 3 2 1

or lettered **3 7 0 2**
D C B A

or identified with eye-catching symbols

3 7 0 2
■ ▲ ● *

PAY ROLL REGISTER

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52	SOCIAL SECURITY NUMBER	NAME	EMPLOYEE		RATE	WITH- HOLDING TAX CLASS	DATE	HOURS WORKED	PREMIUM HOURS	GROSS PAY	O. A. B.	FACTORY DEDUCTIONS	NET PAY	V	CHECK NUMBER	REMARKS
			DEPT.	NO.												
1																1
2																2
3																3
4																4
5																5
6																6
7																7
8																8
9																9
10																10
11																11
12																12
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51																51
52																52

PAY PERIOD ENDING _____ DATE PAID _____ SHEET NO. _____ OF _____

Column Captions

The File Binder Punching at top of this form indicates that the open ends of the pages, thus bound, are at the bottom; therefore, each column heading is duplicated at bottom of page to facilitate identification.

This principle can be applied when punching must appear at top. However, this heading duplication is also serviceable when some parts of the

form are filed in a vertical file.

A basic principle of forms design is at all times to consider the method of filing so that reference to information can be made with minimum effort, handling and time.

When only one series of column headings are possible on a form, always locate post binder punching opposite the end of form on which they appear. The form size illustrated is 16 x 11.

The Effect of "Source Records" on "Reports"

By Ralph R. Tekulve, Forms Consultant
The Standard Register Company
Dayton, Ohio

THE "TABULATING CARD," used in a punched card accounting machine, is well known as perhaps one of the finest examples of a "sortable" record. This principle of being able to sort a record into any of the classifications contained thereon is also one of the principles that motivates a business form designer in simplifying paperwork regardless of the fact that the form might be a handwritten or machine written record.

This brings us to the point as to just where does a handwritten or typed form have a bearing on the "tabulated" record and the accounting machine that performs the actual writing of the report.

As a machine accountant, vested with the responsibility and task of supplying top management with numerous "reports," one is apt to think that the answer to his problems is to concentrate only on the machine and the reports that issue directly from his accounting machines. Yes, this is a very important consideration . . . but not all!

Origin of Information

Let's trace back through such a report issuing from the Machine Accounting Department to see where the information thus summarized, originated. The "Sales Analysis by Product" is a simple one.

- (1) The report got its information from the punched card and the accounting machine.
- (2) The key punch operator got the information from a copy of the invoice.
- (3) The invoice was *copied* from the shipping papers (bills of lading and packing slips) and/or the production order which was used to instruct the "filling" department.
- (4) The shipping papers were *copied* from the production order.
- (5) The production order was *copied* from the sales order or sales contract.
- (6) Not until we get back to the salesman or branch who wrote the original sales order do we find the *original* information as to who was sold what and how much.

Throughout this entire process of making a "sale," filling the order, shipping and identifying the goods and billing the customer, we see repeated copying, re-copying and re-copying.

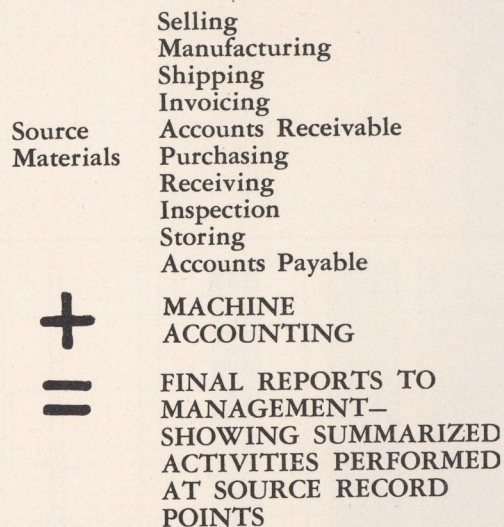
By the time reference numbers, model or serial numbers and quantities reach the keypunch operator there could have been *errors* in *re-copying*, and yet the *immediate* source record from which the key punch operator must work is the *only source* she has to punch from!

Very simply, therefore, once we are aware that this situation does exist, we may then check whether or not the key punch operator is getting the information not only accurately, but *on time* to process the report through the accounting machine.

If you are never late with a report to management, if you are always accurate in your reports and are never "barrelled" at times, then you are already in a pretty good position. BUT . . . If you find yourself in the middle of things, it may be your salvation to check into your "source" records for possible weaknesses! This is the big area in which a paperwork simplifier operates . . . and with dramatic results.

Source Record Relationship

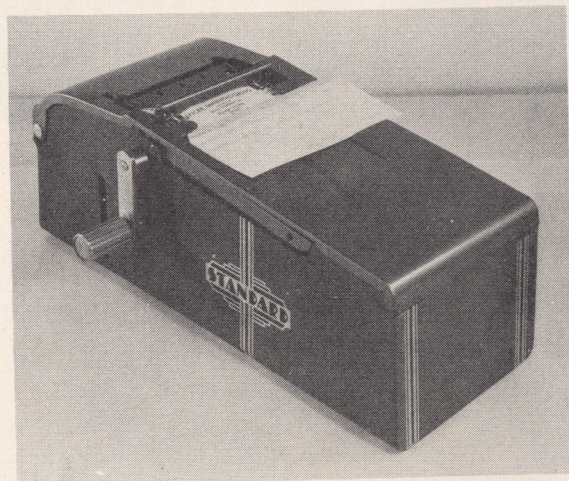
A graphic illustration of the three-phase relationship between source records, machine accounting and final reports will dramatically show how much in the middle you really are and likewise show how ideally located you are to institute a Paperwork Simplification program.



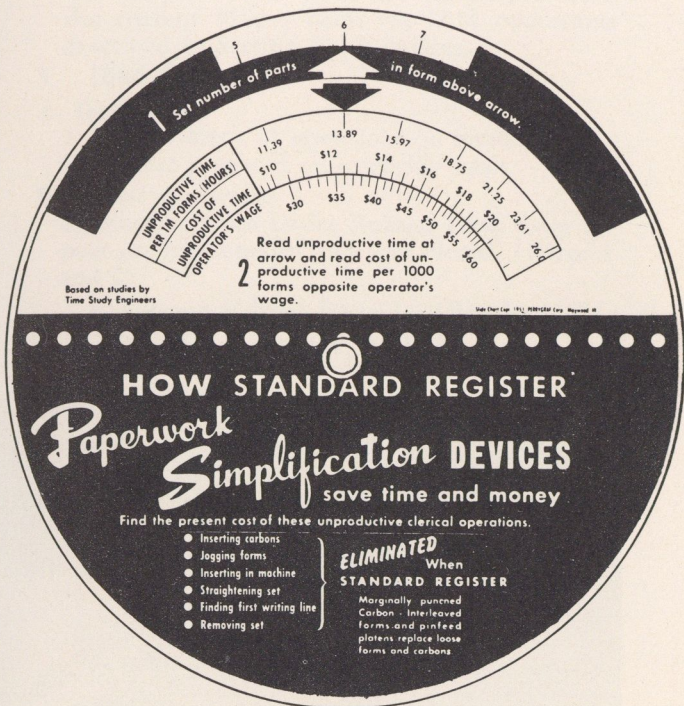
Your sponsorship is top management, your motive for inquiring into "source" records is pure and justifiable . . . two good requisites for action!

A professional forms designer always includes this "source record" investigation in every form

Continued on Page 162



the Punched
Card



MATERIAL CONTROL CHECKING

TRAVELER COPY

ROUGH STORES ISSUE

FOREMAN'S COPY

ROUGH STORES ISSUE

No. 9693

ACCOUNT NO.	PART SYMBOL	QUANTITY	JOURNAL	DATE	STORES	SYMBOL
1724-6	MODEL PART LETTER STYLE	PIECES	FOUNDS	ENTER	NO.	DAY
FINISHED PART NO. 4168						
SYMBOL OR ROUGH NO. S-52						
QUANT. PCS. 150	DEPT. 8					
DATE 4-12-52						
DESCRIPTION Plate						
WEIGHT OR TOL. 62 lbs	STOCK/EXCESS					

1

Above Computer provides a quick and accurate method of determining in time and cost the amount of unproductive handling operations of loose forms and carbon that can be eliminated by use of a one-time carbon interleaved type forms.

STRAIGHT BILL OF LADING — SHORT FORM — ORIGINAL — Not Negotiable

RECEIVED, subject to the classification and tariffs in effect on the date of the issue of this Bill of Lading.

From JOHN DOE COMPANY
STREET CITY STATE
POSTMASTER: THIS PARCEL MAY BE OPENED

From JOHN DOE COMPANY
STREET CITY STATE
POSTMASTER: THIS PARCEL MAY BE OPENED

SHIPPING COPY

ACCOUNTING DEPT. COPY

ORIGINAL INVOICE

JOHN DOE COMPANY
STREET CITY STATE

INVOICE NO. 12345

CUSTOMER'S ORDER NO. SALESMAN DATE ENTERED CODE

SHIP TO (Same as SOLD) SOLD TO (Same as "Shipped To" unless otherwise indicated)

ROUTE HOW SHIPPED COLL. P. PAID CAR NO. DATE SHIPPED

QUANTITY ORDERED	PART NO.	DESCRIPTION	QUANTITY SHIPPED	UNIT PRICE	AMOUNT

Critical Machine Load

1. General

A. Of the many types of machines located in the Chicago Machine Shop, it has been determined that four of them are critical in our operations. If these four are loaded systematically, the remainder of the types can carry the load of work.

B. The four types are:

1. Turret Lathes (IBM Reference TL)
2. Engine Lathes (IBM Reference EL)
3. Vertical Mills (IBM Reference VM)
4. Horizontal Mills (IBM Reference HM)

C. The object here has been to determine the back log in hours by weeks on these machines and other hours (miscellaneous) which add to the total hours of work scheduled for the Machine shop.

2. Specific

A. Source

1. *Original*

a. The Machine Shop is on a "job-order" system with a job envelope for each different part which is required to build machinery or keep a stock of parts on machines previously manufactured.

b. Each job carries the Index number of the part to be manufactured and a number representing the authority to open the job.

c. All open jobs were estimated to the tenths of an hour.

d. The starting point on this job began when the hour estimates by part were key punched into a tab card which then became the "Master" deck for future use and work. Each part in work or on order had a card similar to Exhibit A.

2. Continuing

a. Each new job authority results in an additional master card made on a daily basis prepared as a result of receiving "Form 1" from the order Release Desk. (Exhibit A-1).

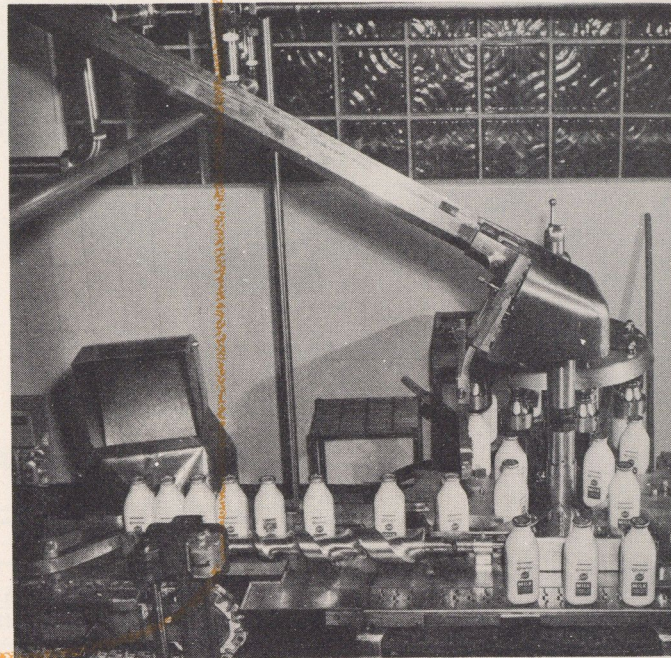
b. Each completed job is removed from the Master deck as a result of receiving "Form 2" from the Order Release Desk (Exhibit A-2.)

c. Elapsed time cards are key-punched on a daily basis showing the following information.

- (1) Authority
- (2) Operator clock number
- (3) Elapsed time (tenths of hours)
- (4) Part number (sometimes called "Index")
- (5) Operation number
- (6) Machine type
- (7) Quantity produced

Items (2) and (5) are not used in this operation but are used for other reports. (See Exhibit B)

By L. A. Wagner



The Milk Bottle Closures are manufactured by the Standard Cap & Seal Corporation of Chicago, Illinois. These Machines are installed in dairies to accomplish an efficient and sanitary closing of the milk bottles immediately prior to delivery. The closure shown on the machine in operation is Duplex, which is a laminated cap, paper with aluminum foil on top. The aluminum foil is printed on a custom basis for the dairy and all the necessary statements are indicated so that the cap complies with all state laws. There is an inner disc inside the bottle to prevent leakage and insure sanitation.

... about the author

Mr. L. A. Wagner is in charge of I.B.M. operations at Standard Cap and Seal. He is assisted by Mr. William Jester, who fitted himself for this work by attending the I.B.M. School in Chicago. Mr. Wagner has been with Standard Cap and Seal for seven years, during which time he has attained company-wide experience, and has been supervisor of the tabulating department since its establishment two year ago. As such, he has converted present operations of the company to the IBM methods and continues to expand the operations of the department by adapting new items.

3. IBM Operation

A. General

1. Master Deck of open jobs on hand.
2. Report prepared on a weekly basis.

B. Detail operations

1. Receive from Order Release Desk daily report on Jobs opened and jobs closed. (Form 1 and 2)

- a. Key punch from Form 1—(Results in Exhibit A)

- (1) Columns 1 - 6—Authority
- (2) Columns 25 - 30—Total Estimate of Hours (in tenths)
- (3) Columns 32 - 38—Index number of Part
- (4) Columns 40 - 43—Turret Lathe hours estimate (if any)
- (5) Columns 45 - 48—Engine Lathe hours estimate (if any)
- (6) Columns 50 - 53—Vertical Mill hours estimate (if any)
- (7) Columns 55 - 58—Horizontal Mill hours estimate (if any)
- (8) Columns 60 - 64—Miscellaneous hours estimate (if any)
- (9) Columns 70 - 72—Quantity ordered
- (10) Column 78—X punch to indicate Master Card

- b. Key punch from Form 2 — (Results in Exhibit C)

- (1) Columns 1 - 6—Authority
- (2) Columns 32 - 38—Index number of part
- (3) Columns 70 - 72—Quantity (same as ordered regardless of quantity produced)

2. Results of a. and b. filed in separate categories until close of week.

3. Elapsed time cards from Machine Shop.
(Exhibit B).

- a. Reproduced in their entirety since the original Elapsed time card is an increase in Work in Process Inventory for the Machine Shop Accounting Statement.

- b. Elapsed time is shown in field 27-30; each operation indicates a different machine within the Machine Shop. Machine Shop operators work on an operation basis; a change of operation on any part indicates that they must change cards with the timekeeper. All hours are accounted for by the week by clock number.

4. *Sort*

- a. Standard Operations used each time make it possible to sort on 44 to produce blanks which are the critical machine cards.

- (i.e. Turret Lathe is always written T Lathe
Engine Lathe is always written E Lathe

Vertical Mill is always written V Mill
Horizontal Mill is always written H Mill
All other operations, not critical, are written with letters in column 44. Paint, Drill, Doall, etc.)

- b. Column 43 alphabetical sort to separate T, E, V, H and Miscellaneous.

- (1) T is code 1
- (2) E is code 2
- (3) V is code 3
- (4) H is code 4

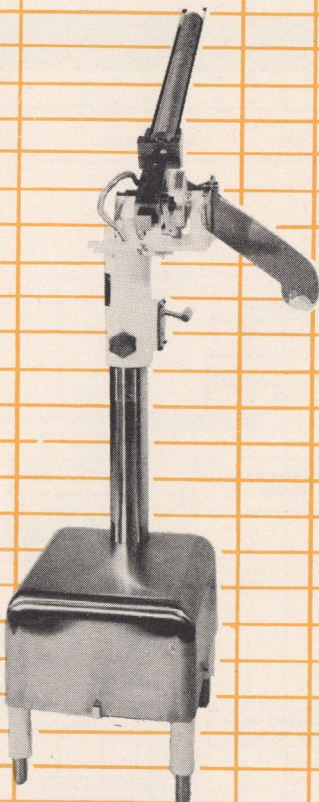
Continued on Page 145

Exhibit A- 2

CLOSE OUTS

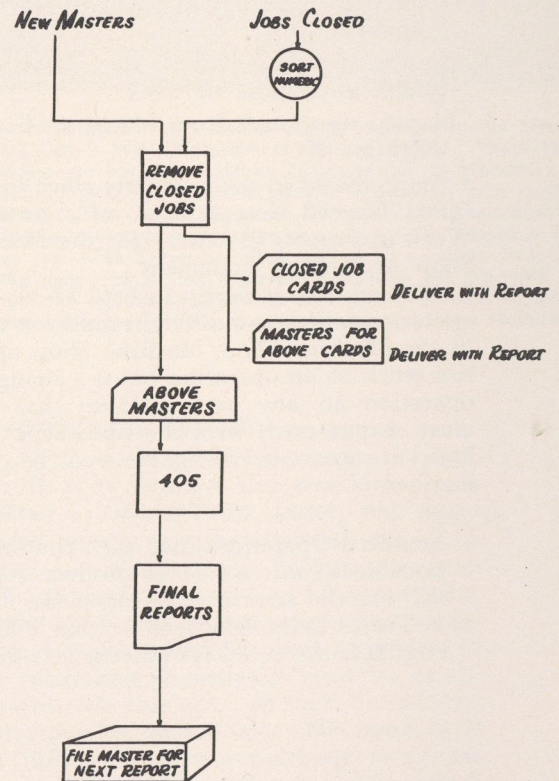
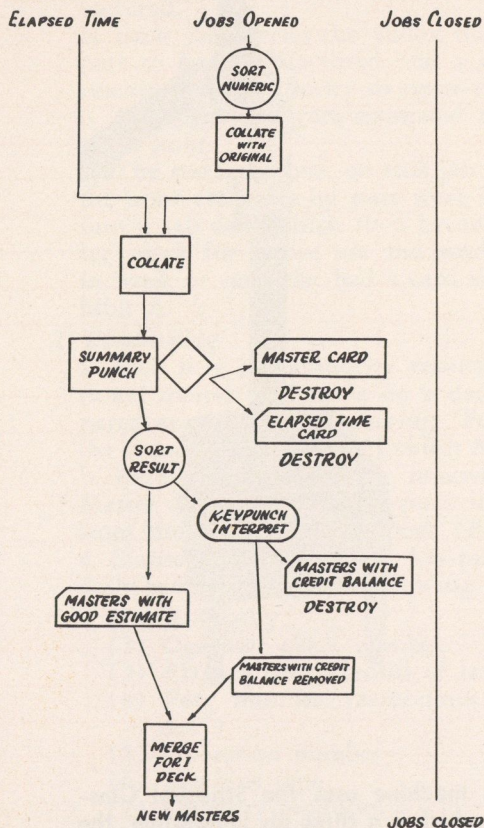
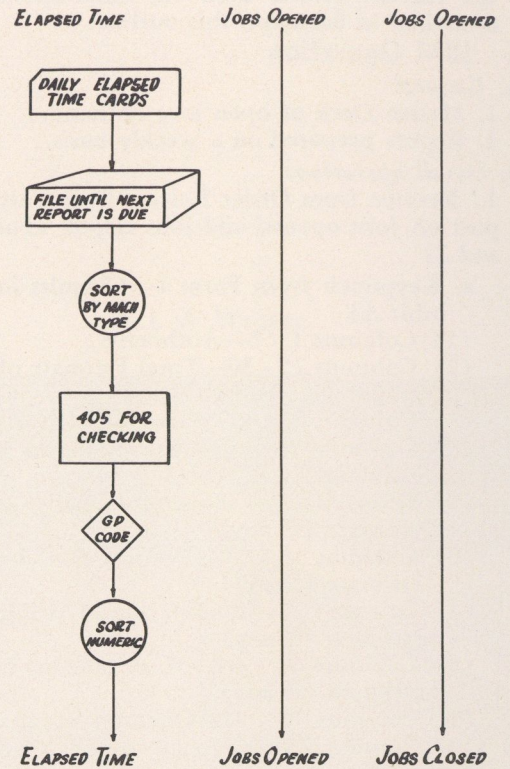
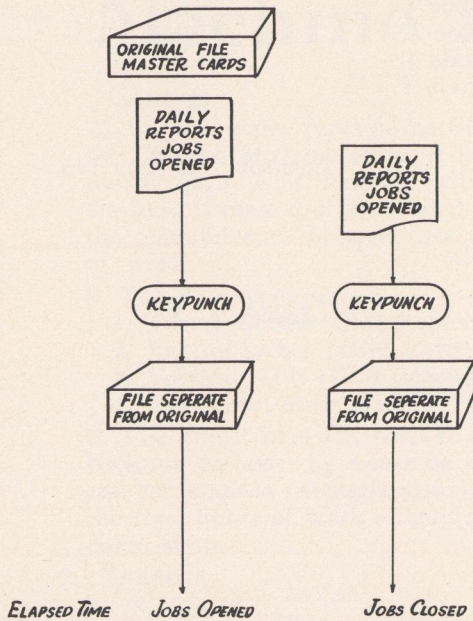
FORM 2

TO: Mach Shop Acc. - DATE: _____ 19__

Authority	Part or Job No.	Quan.
		

This machine uses the Stanseal Closure, which is a three ply lamination, the two outer are paper, and the inner is aluminum foil.

CHICAGO MACHINE SHOP
CRITICAL MACHINE LOAD
FLOW CHART



DATE 19

TO MACHINE SHOP ACCOUNTING

THE FOLLOWING JOB ENVELOPES WERE RELEASED TO THE MACHINE SHOP TODAY:

[illegible]



Order Writing

NEARLY EVERYONE who lives in or near Philadelphia has heard over radio and television or seen in the newspapers, the famous advertising phrase, "Breyers calling." But how many of us know that behind this phrase is the mark-sensing tabulating card?

Each day a group of telephone order clerks call the Breyer's customers who are to be served on the following day. When these customers (drug, candy stores, restaurants, etc.) answer, the telephone girl greets them with "Breyers calling, may we have your order?" As the customer gives his order over the phone, it is recorded on an unpunched tabulating card with a mark-sensing pencil.

One of the most interesting points about this application is that with one quick manual operation (the marking of mark-sensing cards) an entire series of reports may be made with automatic machinery. These include: Order writing, pricing, billing, truck loading, accounts receiv-

able, inventory, sales analysis, etc. It is not even necessary to key punch a card to perform this daily routine. Key punching is reserved for changes in status and new customers. This is how it is done!

Procedure

Punched master cards, for customers to be called, are sent to the order clerks in the morning of the day to be called. They are sorted by time to be called and show the customer name, phone number, and other necessary information. As the calls are made, the detail order cards, which have been marked in pencil are placed behind the customer master card. These completed decks are sent in groups to the machine room to be mark sensed and intersperse gang punched. This process punches the customer information into the detail cards; reads and punches the pencil marks simultaneously.

The detail order cards are then sorted and processed through the electronic calculator for pricing, computing surcharge, quartage figures and space required for the order. This is done in one operation through the calculator at 100 cards per minute.

These cards, which are in order by product, are tabulated to arrive at control totals which are used in each succeeding operation. They are then sorted by route to prepare loading sheets for each truck and after that, sorted by customer to prepare the individual delivery slips and customer bills.

Since total space points are known for each order and for each load, it can be determined quickly if any trucks are either under or overloaded so that adjustments may be made before the trucks are actually loaded.

This series of operations completes the daily routine of taking, filling, and invoicing the customers' order. All of it is done before any truck is loaded for its trip and all pricing and details of the orders are proven. The cards are now available for sales analysis work, accounts receivable and other customer records all of which may be done the following morning.

This daily job has streamlined procedures so as to make many economies which have materially reduced the expenses of the Breyer Ice Cream Company. It has improved customer relations by giving them an easily read detailed invoice with their delivery of the ice cream and has reduced errors almost to the vanishing point.

—National Tabulating
Management Society, "Punch"

At Last!

FULL-VIEW TUB-FILING!

FAST, EASY
CHANGEOVER

2-UNIT FILES
EASY TO
HANDLE!

STEP-O-FLEX
INCLINED FLEXIBLE TUB FILE

Sturdy steel, handsome gray wrinkle finish
36" high, 24" wide, 25³/₄" deep
Step-O-Flex tub files can be made to your own specifications

- Unique inclined "runway" filing compartments afford fully visible tab card identification without fingering.
- Interlocking tongued gliders allow one-hand positioning of cards on 5-step incline.
- Easy-grip rolled edges provide firm comfortable hold even on fully-loaded units.
- 3-channel units avoid excessive weight lifting in reorganizing tub contents.
- Each STEP-O-FLEX FILE provides 30 individual, quickly respaceable file sections.

Write today for
literature and prices.

STEP-O-FLEX COMPANY
616 S. Plymouth Court
Chicago 5, Ill.

the Punched
Card

Proper Name Codes

Continued from Page 91

precisely enough in populations of several thousand. The present code is based primarily on frequency (taken from the telephone directories of Portland, Washington, and Manhattan), and also includes most of the possible two-letter combinations. Nine rather than ten thousand divisions are used because name frequencies divide the alphabet quite neatly into ninths, so that all names starting with any letter will be grouped together by the first code digit alone. The best balance has been sought between fast visual access to code numbers and efficient machine results in sorting for alphabetization.

All entries in this code except explicitly identified names (in capital letters) are beginning entries or lower limits, that is they define the beginning of the interval which extends to but does not include the following entry. All coding therefore involves going just as far in the code as the particular name follows or equals successive entries, stopping on the code number just before the first entry that "exceeds" the name involved. Search for a code number is progressively by page, paragraph, column, and row. For example, the coding of "Mr. Americus" would proceed thus: (a) the page "Aa-Bluz" would be the first obvious choice; (b) down the left edge of this page we would stop in the first paragraph, since this name is in the interval beginning with "Aa" and ending before "An;" (c) across the top of this paragraph we would stop in the column beginning "Am," since we could not continue into that headed "An;" (d) at the head of this column we would pick up the code digits "109," drop down to the row "Ame" and, since we could not go on to "Ami," we would pick up the digit "4" to complete the code number — "Americus" is coded "1094." Other random examples are that "George Arnold" and "Lee Arnold" both would be coded "1164," and "Arnoldus" would be coded "1166."

In this office one "Code" booklet is assigned to each school term, so that digits five to seven are uniform for all individuals coded by it. The serial number, digit eight, is shown by simply tallying for each code number assigned—when the third "John Doe" in any term is coded there are already two tallies after number "2857" hence his serial number is "3." This makes it quite unnecessary to compile and file lists of names with their parallel code numbers. When a student's proper name is changed, of course it is essential to change the "permanent" name-code number accordingly (it is understood that cross-references are set up). It is easy to turn back to the "Code" booklet appropriate to this student's entrance date, and to reassign by the alphabetic and serial code numbers next in available order for the new name. Thus each term's "Code" booklet contains a complete section of all possible student numbers, and the next booklet again will be complete in itself without danger of duplication. We think identification and description have been achieved, in our system, with relative simplicity and efficiency.

THE ARCO MANIFOLDING COMPANY

INCORPORATED 1911

21 ROSE ST., NEW YORK 38, N. Y.

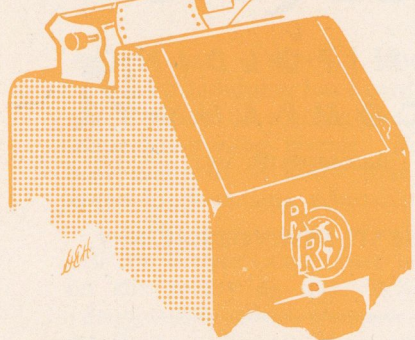
PRINTERS AND
MANUFACTURERS OF
**Marginal Punched
Continuous Forms
for
Tabulating**

*An
Important
Combination:*

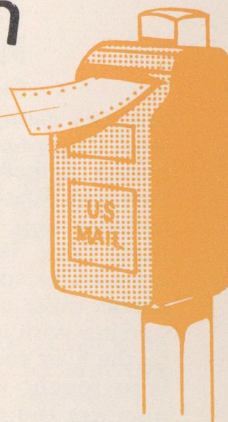
The ability to print and combine multiple forms of accuracy and quality—plus a sound background and long experience in the use of tabulating machines and their practical application to good accounting practice.

**ACCURACY
QUALITY
ECONOMY
SERVICE**

227,000 Billings Per Month



By Walter L. Martin, Manager,
Renewal Department Reserve Life
Insurance Company,
Dallas, Texas



WHEN WE STARTED to write Hospitalization Insurance on a large scale about 1945, we naturally expected to build up a good volume of business through aggressive selling and liberal adjustment policies. In 1946, we billed \$1 million of premiums. We did not anticipate that in successive years our billings would jump to \$3, \$7, \$13 and \$23 million, nor that in 1951 our billings would exceed \$30 million!

Such a volume piles a great deal of detail work on top of the \$40 million of life insurance we have in force—particularly because 80% of our insureds prefer to pay their premiums on a monthly basis. As this is written in early summer, about 227,000 billings per month are being made for the hospitalization insurance, and new applications are pouring in at the rate of 35,000 per month.

The system we originally used was entirely satisfactory on moderate volume. Basically it consisted of preparing in advance for each premium a set of multiple forms including premium notice, reminder, lapse notices, receipt and posting media. Each transaction was manual: the more policies in force, the more employees were required. Normal human errors ran about 2%. There was a great waste of unused forms in the multiple sets as represented by the 70% of insureds who paid premiums promptly.

Searching for a method to eliminate the multiple handling and human elements, our attention was drawn to punched card accounting and tabulating equipment. After much preliminary study, an initial run was made in September, 1949. This proved satisfactory, so we proceeded with conversion to the punched card system. By November 1950 all of our hospitalization billings in 33 states were on this new method.

"Mechanized" Is The Word For It

A variety of Remington Rand machines actually *does* the premium billing: selects the prop-

er bills, makes out the reminder and lapse notices as necessary, prints receipts, prepares a record card for accounting and statistical purposes. The machines make no errors. The few mistakes we do have—tiny portion of our previous experience—are simply the unavoidable human element.

Receipts are mailed out now in from 8 to 24 working hours, as compared to 24 to 36 hours previously. Cash gets into the bank with a similar increase in speed. We have an automatic, internal proof of individual posting; the facilities for producing statistical reports that were almost impossible to achieve before.

Despite a volume increase of nearly 50% in number of transactions, we have not had to increase the number of mail room employees, nor those engaged in the cross-index activity. The direct cost of operating the Renewal Department is approximately the same now as it was with many less transactions before the installation of tabulating equipment. The rental cost of the equipment is about equal to the salary of the employees replaced. Our gain is in the avoidance of great additional overhead: in speed, efficiency and accuracy.

Source Data

From the original application, a typist prepares a billing card. This contains policy number, name and address of insured, due date of next premium, amount of current payment—and the various premiums applicable for monthly, quarterly, semi-annual or annual payment.

This card is mechanically reproduced for the Application File—an alphabetic cross-index of all policyholders. A premium History card is also prepared, containing such other essential information as issue date, agent's number, and facts about the insured.

Billing cards are filed by day-of-month due dates: that is, a premium due on October 18, would go into the identical drawer with another due on November 18 or December 18. The files are distributed at work stations on a cycled basis: one clerk, for example, might handle the 9th, 18th and 27th. This distributes the work load and tends to avoid misfiling.

Twelve days in advance of the due date, billing cards are run through the Sorter to segregate those not due in the current month. The current cards are fed through the Collating Reproducer and Posting Interpreter to create the premium notices at high speed.

The Billing cards for premium notices mailed are held in pending file, and pulled as payments are received. (The procedure is briefed below). Ten days after the due date, remaining cards are processed exactly as previously to create reminder notices.

Nineteen days after the due date, the first Lapse Notice is produced on the Posting Interpreter. Insureds who pay on a monthly basis get a regular Premium Notice for the next month *instead* of a Lapse Notice. If necessary, a final Lapse Notice is mailed 46 days after due date, and the billing card goes to the Lapse file.

Punched Cards Speed Billing

The punched card billing has greatly speeded handling of incoming payments. The remittance is compared with the amounts printed on the card, and the proper amount circled. Also printed on the premium notice is a code number indicating previous mode of payment. Payments that coincide are treated as "regular."

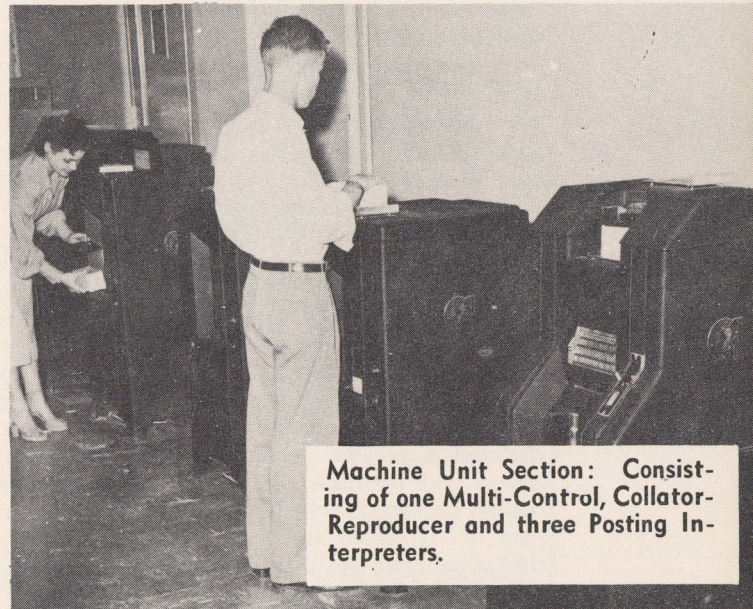
Run through the Collating Reproducer, the Premium Notices match and select the paid Billing Cards. This permits destroyal of the Premium Notices. With a combination of techniques on the Collating Reproducer, the Posting Interpreter and the Tabulator, the following results are then achieved *entirely automatically*:

1. The Billing Cards produce continuous-form individual postcard receipts on the tabulator—at the same time totaling the cash as a check on the adding machine tapes for the day's work.
2. The Billing Cards are reproduced with proper due dates for the *next* payment, and the new cards are returned to file.
3. Information from the Billing Cards is reproduced onto Premium Accounting Cards. This completes the usefulness of the Billing Cards and they are destroyed as of no further value. Additional data to complete the Premium Accounting Cards is now obtained from the Premium History Cards—and in the same machine operation using the Collating Reproducer and Posting Interpreter the current payments are automatically posted onto the Premium History Cards: a printed entry of date and amount on the proper line, plus a punched hole record of the payment. The Premium History Cards are thus actually also active ledger cards for the policies.

The Premium Accounting Cards are in effect a proof of individual posting. They are utilized for working up agents' commissions, daily cash reconciliations, distribution of premiums by states



Thomas H. Osborn, Jr., Sub-Executive of tabulating department unit, examining postcard receipt-notices being listed on tabulator.



Machine Unit Section: Consisting of one Multi-Control, Collator-Reproducer and three Posting Interpreters.



Key Punch Unit: Preparing Billing Cards

Continued on Page 193

Allocating Expenses of a Centralized Tabulating Service Department

By Maynard Branch,
Superintendent of Tabulating
State Farm Life Insurance Company

SOMEWHAT over a year ago we faced the question of whether our tabulating operations would be organized on a centralized or a decentralized arrangement. While recognizing the advantages claimed for a decentralization of tabulating equipment, exhaustive cost studies indicated that in our general plan of organization definite economies in machine rental, personnel, and floor space were to be realized through a concentration of machines, other than keypunches and verifiers, in a central department. At the same time we wished to retain the principal advantages of the decentralized plan, namely, closer supervision and more direct responsibility for the accomplishment of jobs, more ready detection of errors through understanding of card files by staff also handling machines and a better opportunity for informal experiments on procedures.

It was for these reasons that we decided to leave the responsibility for developing punch card applications, the preparation of punch card records and the maintenance of files in the hands of our several administrative departments. At the present time there are thirteen departments which have adapted punch cards to at least some of their figuring operations. It was decided that the processing of cards to the completed reports should be performed as a service function by a central tabulating department. It was felt that the anticipated economies would be realized through a greater percentage of machine utilization and through the opportunity to employ skilled personnel who were trained in the operation of all types of tabulating equipment. At the same time it was felt that all departments for whom service was being rendered should be constantly aware of the expenses of the central department and should know exactly what they were being charged for the work performed.

Function As Service Bureau

IT WAS AGREED that for all practical purposes the central tabulating department should function in the same way as an outside service bureau and that the total cost of the Tabulating Service Department should be statistically absorbed by the departments for whom service was being performed in proportion to the volume and complexity of the work being processed. The remainder of the paper outlines our method of allocating these charges.

A Job Time Card (See Exhibit) is used to record the machine time employed on each job and an IBM time clock is used to stamp the beginning and ending time for each machine. A number is assigned to each machine included in our installation and each type of equipment,

i.e., tabulator, sorter, collator, etc., is coded. A supply of Job Time cards, punched with the machine number, name of machine and type of machine code, for each machine is kept on hand at all times. As jobs are assigned, the operator selects a Job Time card for the machine to be used, writes the job number and his employee number and stamps the starting time. When he has completed his operation on a particular machine, the ending time is stamped on the time card. At the end of each day all Job Time cards are scrutinized by the Tabulating Superintendent for reasonableness and the elapsed time calculated and punched into the cards.

At the end of each quarter, the Job Time cards are sorted by machine number and type of machine code and tabulated to determine the time each machine was used during the three months' period. The rental of each machine for the period is then divided by the number of hours the machine was used during the quarter to determine an hourly rental rate. The hourly machine rental cost of each machine is punched into rate cards and these cards sorted ahead of the detail Job Time cards and the total rental cost of each machine employed in each job during the quarter is calculated on the 602A Calculating Punch. The detail job time cards are sorted by job number and department code and tabulated to determine the total machine time and resulting rental charge as well as the grand total of the machine time and rental for a three months' period for each department for which work has been performed. A direct charge is made for the rental of keypunches and verifiers used exclusively by departments other than the Tabulating Service Department.

Labor, Space, Rental Costs Included

SALARY CHARGES are also made on an hourly rate basis. This rate is determined by dividing the total salary expense of the Tabulating Service Department, including supervisors' salaries, by the net clerical hours as shown by the Job Time cards for the quarter. This rate is then applied to the total hours worked on each job for each department for which service has been performed. Thus far we have not attempted to refine our hourly rates to take into account varying salaries paid to individual employees of the Tabulating Service Department and by including supervisory salaries, the expense of superintendence effectively follows the direct labor costs.

Rental of floor space is allocated on the same basis as machine rental. In other words, the rental of floor space for each quarter is divided by the total machine hours to obtain an average hourly rate and this rate applied to the number of machine hours furnished to each of the other departments to determine the total floor space rental to be absorbed by each depart-

ment for which work has been performed during the period.

General overhead, including the cost of sundry supplies, printing and stationery, postage, telephone and express, traveling expenses, depreciation of furniture and fixtures, is allocated either on the basis of machine hours or clerical hours consumed by each of the departments for which work has been performed. These allocation factors are established at the end of each quarter and are applied to each type of expense in the category of general overhead which was incurred in that particular quarter. Machine hours consumed in the quarter are used as the basis of distributing the expense of sundry supplies, printing and stationery and depreciation of furniture and fixtures. The expense of postage, telephone, telegraph and express, and traveling expenses is distributed on the basis of net clerical hours. Because the incurred expenses for a given three months period are distributed on the basis of allocation factors developed from machine hours and clerical hours consumed in the same period, the incurred expenses of the Tabulating Service Department must be first determined and then redistributed in the quarterly expense statements of the other depart-

ments for which service was furnished.

At the end of each quarter, a statement of the allocated expenses for the three months' period is furnished by the Superintendent of Tabulating to each department for which work has been performed during the quarter. This statement shows the number of hours worked, and the amount of each type of expense which has been allocated for the preceding three months' period. The total of the expenses must be absorbed in the quarterly budgets of each of the other departments of the Company. At the beginning of each year the Superintendent of Tabulating prepares a budget of the anticipated expenses of his department and furnishes each of the other department supervisors with an estimate of his share of the total expenses which he may expect to absorb during the ensuing year. Each supervisor then estimates the incidence of his total annual expenses for tabulating service and establishes his year-to-date estimate at the end of each quarter in his own departmental expenses budget for comparison with the allocated portion of the actual year-to-date expenses of the Tabulating Service Department.

—Insurance Accounting-Statistical Association,
"The Interpreter"

[illegible]

MACHINE CODES		OPERATION CODES	
00 Manual (No Machine used)	47 Cardatype	10 Messenger Service	60 Waiting Time—Chargeable
15 Numeric Punches	48 Tape Cont. Card Pch. 43	11 Preparatory at Machine	71 Balancing with Acctg. Mach.
16 Alpha. Duplicating Punch	49 Card Cont. Tape Pch. 63	12 Coding	72 Proving with Acctg. Mach. (Multiplying, Reproducing, Etc.)
17 Alpha. Printing Punch		13 Decoding	73 Tabulating
			74 Listing
22 Numeric Verifier	Accounting Machines	Accounting Machines	Non-Billable Operations
23 Alphabetic Verifier	50-56 Counter 402	77-80 Counter 405	80 Clerical (Non-Billable)
	51-80 Counter 402	78 -	81 Awaiting Machines
	53-56 Counter 403	79-285 with 518	82 Awaiting Assignment
	54-80 Counter 403	80-285 with 513	83 Estimating—Procedure Plan'g.
	55-Type 407	82-56 Counter 405 with 517	84 Receiving Training
31 Gang Punch	60-56 Counter 402 with S.P.	83-56 Counter 405 with 513	85 Supervising
32 Auto. Reprod. Punch	61-80 Counter 402 with S.P.	84-80 Counter 405 with 517	86 Illness
33 Multiplying Punch 801	62-56 Counter 403 with S.P.	85-80 Counter 405 with 513	87 Late
34 Mult. & Crossfotch Punch 681	63-80 Counter 403 with S.P.	88-56 Counter 416 with 517	88 Vacation
35 Mult. Punch & Add'l. Cross. 601	64	87-56 Counter 416 with 513	89 Miscellaneous
36 Multiplying Punch 602	66 Numeric Interpreter 550-551	88-80 Counter 416 with 517	90
38 End Reprod. & Interpreter 519	67 Alphabetic Interpreter 552	89-80 Counter 416 with 513	91 Machine Repair Time
39 Calculating Punch 604	68 Facsimile Posting Machine 954	90 Card Progr. Elect. Calc.	92 Machine Error
40 Sorter 082		91 Proof Machine	93 Instruction Error
41 Sorter 080		92	94 Operator Error
42 Card Count Sorter 075	70-56 Counter 416	93 Other Office Equipment	95 Customer Error
43 Numeric Collator 77	71-80 Counter 416	98-99 to 80 Reproducer	96
44 Alpha. Collator 89	72-285		
45 Electronic Stat. Mach. 101	75-56 Counter 405		
46 Electronic Stat. Mach. with S.P.			

Tabulating Records

for Property Accounting

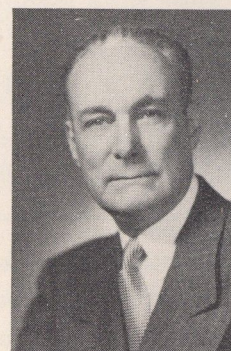
By Ralph L. Berry

Here, we think, is an outstanding article on the application of tabulating techniques to property accounting. The author, Ralph L. Berry, member of the National Association of Cost Accountants, draws on his more than a quarter of a century of experience in production and contract activities with the American Appraisal Co., for this paper which was prepared as a speech he gave before the Milwaukee chapter of The National Machine Accountants association. Our thanks to Andrew Hansen, Milwaukee Chapter President, for directing our attention to this talk.

THE VALUE OF TABULATING EQUIPMENT for payroll accounting, cost accounting, and other phases of accounting which involve a great volume of computations has been quite well established, and techniques have been developed which produce the desired results or schedules with amazing rapidity. Results which it might take weeks to obtain through manual accounting methods may now be obtained in a matter of hours. Through the use of this equipment, information which it would be impractical to develop through manual accounting methods or which could not possibly be available in time to meet the need of management, may now be developed promptly.

Those of us who are concerned primarily with the field of property records and property accounting have naturally given considerable thought to the possibility of setting up property records on tabulating cards. We recognize the limitations of tabulating equipment and realize that it will not do our thinking or our planning for us. However, in developing and maintaining property and depreciation records, we are confronted with a great volume of mathematical computations involving addition, subtraction, multiplication, and division, and with the problem of classifying, listing, and summarizing the results. We have found that tabulating equipment may be used effectively to reduce the amount of human effort required and that it enables us to develop summaries and listings which would otherwise be impracticable and which are tremendously helpful to management and to the

... about
the
author



Ralph L. Berry is a graduate of Cornell College and has been associated with The American Appraisal Company for over 25 years, serving on the field and office staff for a number of years. He is at present a special representative connected with the Home Office Contract Department in a supervisory capacity. Much of his experience in the production end of the business has been in the preparation of retrospective appraisals for income tax and accounting purposes.

Mr. Berry has had considerable experience in speaking before accounting and insurance groups on the application of appraisals to their particular requirements. He has also written numerous articles on these subjects.

For over 25 years Mr. Berry has been a member of the N. A. C. A. and is at present a Director of the Milwaukee Chapter. He has, in the past, served as Director of the Detroit and Kansas City Chapters.

property accountant.

We do not feel, however, that tabulating is the universal answer, and we do not usually recommend it for companies with small plants. However, we do find it helpful for large companies with items of property running into the thousands.

Importance of Modern Business Machines

I have sometimes tried to imagine what busi-

the *Punched
Card*

... about the company

As the result of a young court reporter having seen, in a fire loss adjustment case concerning a flour mill fire in Minneapolis, that property losses crippled business because business had no way of proving its loss, the need for an independent, precise inventory made before the fire occurred was recognized. In 1896, John L. Moon, the court reporter, and William M. Young, a practical construction contractor, founded the profession of organized appraisal service which met a crying need of industry of the time.

This was the beginning of the American Appraisal Company which pioneered in furnishing a complete service requiring tested formulae, research, statistical analyses, development of original data covering property, property values, depreciation, obsolescence, and property control. The company expanded and now has district offices established throughout the United States and two abroad.

In the 30's the American Appraisal Company established its Continuous Service Department to assure the perpetuation of a company record of property for insurance and accounting requirements. In addition to private business assignments, the company has undertaken governmental projects, an important one being that of determining the depreciation of all surplus war materiel in the European and Pacific theatres.

The American Appraisal Company is acknowledged as the largest organization devoted exclusively to independent property analysis and valuation, and as consultants in property economics.

ness must have been like 75 or 100 years ago when all of the correspondence was written out in long-hand, when the books of account were huge bound volumes in which all the entries were made with pen and ink, and when long columns of figures had to be totalled with no mechanical aid except a pencil. If business were handicapped by such slow and tedious methods today, it seems inconceivable that giant corporations such as General Motors and United States Steel could ever have come into being. The development of our modern business machines has, of course, revolutionized our office procedures and accounting methods and has given us a flexibility in our records which was impossible a century ago.

With the increase in size and complexity of our industrial plants and with the advent of the income tax and other governmental controls, there has developed a need for better and more detailed property records.

History of Property Accounting

I think it may be well to review briefly the history of property accounting in order that we may better visualize present problems. Prior to 1913, there was no income tax law, and corpora-

tions were subject to very little control by government agencies. It was pretty much up to management to decide how they should carry their property accounts and whether they should take depreciation or not. Some corporations tried to do a good job of property accounting with the tools at hand, but others paid it scant attention. In prosperous years some corporations charged off all of their additions and improvements to expense and likewise charged depreciation on an erratic basis. In good years they might take a large amount of depreciation and in poor years, they might omit it entirely.

With the advent of the income tax laws, the corporate accounts and earnings statements were subject to audit by the Bureau of Internal Revenue, and rules and regulations were prescribed for handling the property and depreciation accounts. From the outset, a reasonable allowance for depreciation was recognized as a proper charge against earnings, but the Treasury Department insisted that there be some relation between the depreciation charge and the useful life of the property and that capital items be capitalized. The Department also insisted that depreciation should not be taken on assets after they had been fully depreciated nor on assets which are no longer in use in the business. As time went on and the rules became more exacting, management was forced to give greater attention to its property accounting methods. For income tax and other reasons, management has come to realize that it is necessary to account for property as things rather than merely as so many dollars.

Property Should Be Treated As "Things"

Because of lax accounting methods in the past, the property accounts of many companies have come to be a meaningless jumble of figures which purport to reflect the original investment in the property, but in many cases do not actually do so. This is due to a number of reasons among which are the facts that many property additions are never charged to the property accounts and many property deductions are never written off. If you will review the property accounts of any corporation in existence for a long term of years you will, no doubt, be impressed by the fact that whereas the accounts reflect consistent substantial additions through the years, there are very few deductions recorded. This failure to record deductions may be due to a lack of control over transfers and disposals of capital assets so that the accounting department never knows that a machine has been sold or scrapped or moved to another plant. Or it may be due to inadequate property records which make it impossible for the accounting department to properly set up the deduction because of inability to determine the date of acquisition and cost of the asset. These errors may be avoided if we treat property as things and control it by items.

Changes That Affect Property Accounts

It seems rather strange that a company which makes a periodic check of its stock inventory in order to check and correct its records, may carry its property accounts forward for a period of 25

years with no attempt to verify the existence of the assets which are carried on the property accounts. And, bear in mind the fact that in most manufacturing concerns, the plant assets amount to a great many more dollars than the inventory accounts. We used to refer to the plant property as "fixed assets" and some still do, but actually that term is a misnomer. In a progressive growing industrial plant, equipment changes are continually being made. Even large and expensive machine units are moved, rebuilt, or replaced by more modern machines, and changes are continually made in the piping, wiring, and general plant equipment. Even the buildings are changed - new floors, a balcony here, a partition there, and perhaps a new story may be added to an existing structure.

It is difficult at best for the accounting department to keep up with all these changes, to make the proper segregation of capital and maintenance expenditures, and to record the property deductions. It has been our experience that when a check is made of the property against the property accounts, almost invariably it is found that there are substantial assets carried on the property accounts which are no longer in the plant. These unrecorded deductions may often run into hundreds of thousands of dollars.

Basic Factors in Setting up Property Accounts

Where the property accounts have gotten out of hand, it seems obvious that it is necessary to correct the prior errors and obtain a fresh starting point. This cannot be done by merely checking the existing property records. It is necessary to start with an inventory of the plant assets or groups of assets at reasonable remaining life expectancy. The next step is to determine from the property accounts when each of these assets was acquired and what its cost was. It will, of course, frequently be found impossible to identify the individual costs of each item and this is particularly true of such classifications of property as piping, wiring, and minor plant equipment. Here it may be necessary to resort to methods of allocation of book costs on the basis of normal costs established at the estimated dates of acquisition. The results, however, will establish a much more realistic picture of the age, cost, and remaining expectancy of life of the various units of property than you now have. After you have completed this process, you will undoubtedly find a large residue of costs in the property accounts which represent the costs of property no longer in existence and these costs should be charged off against the depreciation reserve.

With this information at hand, you are in a position to set up a detailed property record which will be invaluable in the future for adequate property control and depreciation accounting.

The next question that arises is what to do with the accumulated depreciation reserves on the books. It is probable that these book reserves represent the amount of depreciation which you have been allowed to take in the past for income

tax purposes, and, right or wrong, you are not permitted to change this allowed depreciation except for the few open tax years. In order to complete our property ledger, therefore, it is necessary to allocate the book reserves to the individual items or classes of property in some logical manner.

Where Machine Accounting Takes Over

Since we now know the dates of acquisition and the estimated remaining lives of the various items, it is possible to compute mathematically the normal accrued depreciation on each to date. In order to do this by manual method, a great deal of time is required, and it is here that tabulating enters the picture. In a large plant we are dealing with thousands of items, and tabulating equipment may well be used to compute the normal accrued depreciation. The formula is a simple one:

$$\text{Cost} \times \frac{\text{expired life}}{\text{total life}} = \text{normal accrued depreciation}$$

This normal accrued depreciation is then totalled and compared with the book reserves. Since management usually wants to take as much depreciation for tax purposes as it can, you will likely find that the total book reserves are in excess of of the computed normal reserve. Book reserves are then allocated to the individual items on the basis of the computed reserve. This can be done quickly by tabulating machine methods.

The next step is one of subtraction which can be quickly done on the tabulating machine. The allocated book reserve is deducted from the original cost of the asset to determine the unrecovered cost and this is punched into the cards. The unrecovered cost is then divided by the estimated remaining life to determine in dollars and cents the proper annual depreciation provision for that item. If desired, the monthly depreciation provision can be punched into the cards. By running the cards through the machine, the total depreciation provision for each account for the month or year may be readily determined.

We now have a deck of several thousand tabulating cards - one for each major unit or group of property items reflecting the date of acquisition, the original cost, the unrecovered cost at the beginning of the year, and the annual depreciation provision. During the year, new cards will be prepared for new assets acquired and the cards will be withdrawn for assets which are sold or scrapped.

Designing Tabulating Cards

You may be interested to know that we have found it possible in the great majority of cases to lay out the fields in such a manner that one tabulating card will serve the purpose for each item of controllable property. Considerable thought needs to be given to the design of the card as the requirements will vary in different cases and the desired information should all be coded and punched into the proper field. We

usually recommend that the typed property ledger be maintained, as the tabulating card does not provide sufficient space for a complete technical description of each of the machines and buildings, etc. A brief identifying description is usually shown on the tabulating card and the item may often be further identified by punching in the tag number, the serial number, and the property classification and property account. The card may be designed to reflect the location by building, floor, and department or process center. It should certainly show the date acquired, the original cost, the unrecovered cost at the beginning of the year, and the annual depreciation provision and date of retirement.

The use of tabulating cards greatly facilitates the computation of the annual depreciation charges for closing of the books and for preparation of income tax returns. It avoids the necessity of making individual entries on the detailed plant ledger sheet of the annual depreciation charges. It is only for those assets which are retired during the year that it is necessary to post the total accrued depreciation to the plant ledger sheet. The necessary adjustment entries are then made on the books to account for these retirements.

Many Valuable Reports For Management

However, this is only the beginning. The use of tabulating cards opens up a whole new realm of possibilities for better property control and property accounting. For cost accounting purposes, it is desirable to have your depreciation charges broken down by departments or process centers. With tabulating cards this is no trick at all. You can readily run off the depreciation by accounts or departments or in almost any manner desired.

I pointed out earlier that one of the difficulties encountered in the past in controlling property was the failure to check the property accounts periodically in much the same manner that you check your inventories. It is rather difficult to take a plant ledger in manual form out into the plant to check the existence and location of the assets; but with the use of tabulating cards, you can run off a list of the machinery and equipment by buildings, floors and departments and turn these lists over to the foreman or others who may be asked to check the property inventory. At the same time that the property is being checked for existence and location, the remaining lists should be checked and adjustments made where desirable. Through the use of these tabulated lists, the check of the property can be made, and ample notes jotted down, without messing up the original property record.

With periodic checks, you will be able to catch unrecorded deductions and transfers while they are still fresh and thus obtain real property control. Through the periodic adjustment of remaining lists, you will avoid taking losses on retirements which may be disallowed for income tax purposes.

For purposes of estimating replacement requirements, management may request you to run

off a list of the assets by dates of estimated retirement. You can, of course, run such a list by date of retirement, or by date of acquisition if desired.

If management wants a list of certain classes of equipment such as power feed wiring, or manufacturing piping, or motors, you can furnish such a list promptly. In fact, you are in a position to furnish management with almost any breakdown of its investment in plant property which may be desired.

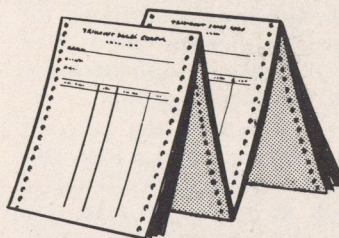
Your plant engineering and maintenance departments and others may be interested in a list of major machine units by tag number showing the identifying description of each machine and its location by building, floor, and department, for ready reference.

The production control department will undoubtedly be interested in a similar list grouping the machines by types for scheduling machine operations.

Although fire losses are not settled on the basis of book values, the availability of a detailed property record showing the location of each item of equipment or group of equipment of like kind, such as piping and electric wiring will prove tremendously helpful in the preparation of a proof of loss. You can readily run off a list of the assets contained in the damaged portion of the plant, but it will be necessary to go back to the detailed plant ledger to obtain the necessary descriptions to permit of repricing the assets at the date of the fire and to account for those assets which have not been capitalized. It should also be borne in mind that depreciation for accounting purposes is one thing, but depreciation for insurance purposes is quite another and book depreciation should not be used in settling a fire loss.

One of the principal reasons that management has often hesitated to install an adequate system of property control is the seeming magnitude of the task. Where large properties are involved, tabulating can contribute much through efficiency and economy in the operation of the system and by broadening the utility of the property record. Many large companies have placed their property records on tabulating cards with satisfactory results and we believe that others might well explore the possibility of the use of tabulating equipment in connection with their property accounting problems.

TABULATING FORMS



for I. B. M. Remington Rand
and other machines

- 1-Perfectly Precisioned
- 2-Marginally Punched
- 3-With or without Carbon

Write Dept. PC52

AMERICAN REGISTER CO.

First at K - Boston 27, Mass.

Public Library Mechanizes Book Loans

By EDWARD A. MONKEVICH

THE DETROIT PUBLIC LIBRARY administration, always alert for faster and more economical methods, adopted the punched card date system on December 7, 1948. It was to supplement an already existing Central Typing Bureau. The centralization of the typing and mailing of overdue notices had been in operation for a number of years. Book cards for overdue books were sent to Central Typing Bureau and after notices were typed and mailed to the patron, cards were returned to the branches daily.

Under the then existing charging system, each book had a card with the call number (classification number) or author and title (for fiction). When each book was returned to the library, its card had to be inserted into the book pocket before it could re-circulate.

With a circulation of approximately four million books per year many clerical hours were spent removing date cards, when the book was checked out and then filing the book card so it could be replaced in the book when it was returned. Many times books sought for on the shelves by the public were idly waiting on a book truck for librarians or clerks, busy with other duties, to prepare the books for re-circulation. Here the punched date card made a miraculous change.

The necessary preparations for changing the charging system over to the punched date card were taken in stride. An average weekly circulation of each branch was determined. Agencies were divided into five groups by circulation and a common weekly due date assigned each. This was to even the flow of work through the Tabulating Bureau on the basis of five working days.

With the exception of reference material all books circulate for about 4 weeks. Agencies are assigned a fixed day each week when a new deck is put in use. As the cards have been predated all books circulated during that week will have the same due date. Each agency was also assigned an identification number.

The charging system was changed to adapt itself to the punched card. In the past a patron wrote his card number on the book card and a date card was inserted into the book pocket by the charging clerk. The book cards were kept for library records. These cards were hand filed numerically by class number or alphabetically by author and title in the fiction group.

With the new charging system the patron's card number has been discarded, and a loan slip designed. The patron is requested to fill out a loan slip for each book he wishes to take out. (*Exhibit 1*) The loan slip requires the name, address and zone number of the patron; the call number or other brief information which the patron copies from the book pocket. The loan

About
the
Author . . .



Edward Monkevich was born in Boston, Massachusetts, Nov. 4, 1912. In 1914 his family moved to Detroit. His ambition was to graduate from law school and pass the state bar examination but unforeseen circumstances altered this.

He has been employed by the Detroit Public Library since 1933. His years of library experience, in various positions, gave him a clear picture of what the library expected of the punched card applications on book loans. In 1948 when the Tabulating Bureau was organized he was asked to take charge of this department. He received on the job training from the IBM personnel Service Bureau.

His hobby is scouting. As chairman for a Cub Scout Pack, Assistant Scoutmaster of a troop and Advisor to a Senior Post he finds many hours of strenuous relaxation.

slips, each in its proper book pocket, are taken to the clerk at the charge desk. Each loan agency is equipped with an electric stamping machine which, when the loan slip is inserted, by the clerk, stamps the loan number following numerical sequence, date due, agency name and agency identification number. Loan slips, after revision against the patron's library card, the book pocket for book identification, and insertion into the electric stamp machine are then placed face down in a container to keep the slips in numerical order. A previously prepared card with identical information both punched into the card and printed on it is inserted in the book pocket as a date card.

Immediately on the return of the book the punched date card is removed and thus the book is ready for re-circulation.

Tabulating Bureau Organized

Organization of the Tabulating Bureau was another step toward date card. Originally the administration experimented with the long 81 column card. (*Exhibit 2*) A 519 Punch Reproducer with an end printer was used to punch and print the necessary information into the cards. The

00403

Fill in this form before presenting the book for withdrawal. If more than one book is taken, your name and address on the first slip is sufficient.

COPY FROM BOOK POCKET

Jackson C.13

Ramona

Name *Claudia J. J. J.*

Address *1000 Bismell*

DETROIT *38* MICHIGAN

ZONE

D-7

Exhibit 1

IBM 142607

LOAN NO. **43-265**

DATE DUE **4444**

MONTH DAY MONTH DAY

PLEASE KEEP THIS CARD IN BOOK POCKET
DO NOT BEND OR FOLD

NO RENEWALS

DETROIT PUBLIC LIBRARY

PLEASE GIVE LOAN NO. AND DATE DUE
WHEN REFERRING TO THIS LOAN

NO RENEWALS

DO NOT BEND OR FOLD

PLEASE KEEP THIS CARD IN BOOK POCKET

DATE DUE

3 9 3 1

MONTH DAY MONTH DAY

Exhibit 2

length of the 81 column card caused it to protrude from many of the smaller books unintentionally damaging the punched card and making machine operation difficult. The numerical printing of month and day due was confusing to many patrons. With the change to the 51 column card (Exhibit 3) the difficulties that arose with the 81 column card were nullified, and the punched card reached its goal as a medium for fast and economical circulation of library books.

The punched date card was designed to be used 12 times. When the average agency weekly quota was determined the Tabulating Bureau prepared seven sets of cards for each agency. In each set (deck) of cards is punched the year, due date, branch identification number, transaction and deck numbers. The transaction number runs numerically from 1 to 4,000 or higher, sufficient to cover any fluctuation in branch circulation. This process of punching is done on the 513 Reproducer. The punched cards are then run through a 551 Interpreter and the punching is interpreted and printed on the card. The branch uses

KEEP THIS CARD
IN THIS POCKET

LATEST DATE
IS DATE DUE

NO RENEWALS

LOAN NUMBER

DETROIT
PUBLIC LIBRARY

CPGIE HBI

LOAN NO. 1 2 3 4 5 6 7 8 9 10 11 12

Exhibit 3

set one or deck one the first week, and deck two the second week and so on through deck seven. By then, deck one has been processed for overdues and the missing cards or damaged cards have been remade and interfiled, thus the deck is again complete numerically. A new date is punched into the cards and printed on them and the deck is returned to the branch for reuse. This cycle continues for 12 dates (about 20 months) then seven new sets are made for each branch.

Branches Served

Branches send punched date cards from returned books to the Tabulating Bureau daily. They are processed on the sorter for clearing of overdue dates. The remainder, which are not overdue, are filed by due date and branch until such time as overdue. The overdue date cards are sent to Central Typing Bureau for clearing against the original loan slips.

Punched cards are processed twelve days after due date for missing transaction numbers. The processing consists of the following:

1. Removal of punched cards from the file drawers by branch.
2. Processing on the sorter for numerical order.
3. Comparing against a complete set of cards (master deck) on the collator for selection of missing numbers.
4. Punching and printing of new cards for those selected as missing.
5. Interfiling of the new or remade cards into the incomplete deck so that it will be numerically complete.
6. Gang punching, on the 513 and interpreting on the 551 of a new due date.
7. Cards are packaged and sent to the branches by library trucks.

In the comparing process, missing numbers are selected which are the overdue transaction numbers. From these any of the remaining damaged cards are cleared by hand. Then an IBM Overdue Notice Form (Exhibit 4) is filled out and attached to each packet (master cards) of selected overdues.

These are sent to Central Typing where after pulling the proper transaction slip they discard the remaining slips and return the master deck to Tabulating Bureau.

IBM OVERDUE NOTICE	
Agency	_____
Complete Station Number	_____
Due	_____
First Notice Mailed	_____
Initial	Total
Second Notice Mailed	_____
Initial	Total
Bill Made	Total
.....	
To be returned with master deck	
Agency	_____
Master Deck Number	_____

Exhibit 4

The Photo Clerk has been added to expedite the sending of overdue notices. A photograph is taken of the original overdue loan slip and used as the overdue notice. This eliminates the time required in the past for the typing of notices.

The Tabulating Bureau has the following equipment:

- 1 Sorter
- 1 Collator
- 1 Reproducer—513
- 2 Interpreters—551

It is staffed by three full time employees and carries a work load of 22,000 to 25,000 cards per day. It is independent of outside sources, other than machine service, to bring its work to completion.

To supply each agency with their quota of seven decks requires 860,000 cards. The remakes average is approximately 12%, thus in a 20 month period approximately 1,070,000 cards are used.

Develop Work Group

Continued from Page 92

3. Willingness to recognize ability of others. The supervisor must be ready to receive, use and give credit for ideas originated or transmitted by subordinates. He goes out of his way to encourage employee contributions and suggestions, recognizing the fact that the line worker is often in a better position than he to detect and analyze weaknesses and defects and offer means of betterment. The supervisor does not arrogate only unto himself the right to suggest changes or improve techniques, nor does he fail to reward and pass up the line the positive contributions of his subordinates.

4. Treating subordinates as individuals. The supervisor must recognize the existence of differences among and between individuals, the need for different approaches to and different treatments of them. He must appeal to reason and respect, not fear or favor. He must realize and *accept* the fact that human behavior is motivated primarily by wants and that it is an important part of his job and responsibilities to discover employees' wants and attempt to satisfy them in so far as they are reasonable and practicable of achievement within the framework of the job situation.

5. Giving constructive criticism. The supervisor must not criticize just to find fault or show who is "boss." Rather, criticism should be directed toward helping the worker do a better job, improving technique or overcoming bad habits. Criticism for its own sake is neither intelligent nor helpful. It must be backed up by reason and *unemotional* correction and eventually followed up to determine its effectiveness.

6. Avoiding buck-passing. When the supervisor delegates responsibility, it is, in effect, immediate delegation in that he cannot avoid ultimate accountability. He must not, therefore, shift the blame for mistakes to subordinates, but, rather, back them up as he would expect to be by authority higher than his own. The supervisor's failure to do so will not only negate the effectiveness and usefulness of his subordinates, but will contribute materially to a lessening of the respect in which he, himself, is held and the authority which he wields.

While this list might be extended indefinitely, it seems sufficient to show the direction which the supervisor must travel in order to reach his goal of "the most productive work group." It is, moreover, an indication of the fact that the supervisor's effectiveness is measured not only or not so much by his personal work as by the quality of performance of staff supervised and the extent to which staff respects and cooperates with him. The supervisor must always be conscious of the fact that staff failures are, in reality, management failures, and, consequently, that success or failure of the organization is in direct ratio to the success or failure of those performing the jobs. Although it may sometimes seem so—no one works in a vacuum!

It may thus be seen that group efficiency must always be a joint responsibility of the leader and the group. The supervisor must not only understand the techniques of group leadership, but the relationship of group productivity and morale to different types of leadership. He must be aware not only of what *he* does, but of the effect of his actions on what the *group* does. Therefore, the basis of group efficiency is joint responsibility, participation and recognition.

It is obvious that the leadership type of supervision offers the best hope of achieving the goal of the most productive work group. The leader appeals to subordinates' sense of cooperation and teamwork, not command or threat. He acts as captain, calling the play, but sees to it that

the ball is advanced by the efforts of the whole team. He shares, whenever possible, with the group in planning, assigning, scheduling. He gives reasons for decisions, develops maximum participation and imbues others with a sense of responsibility. In return, the team responds through understanding, willingness and respect. It works with a sense of purpose and presents few problems of morale, motivation of production.

The final step remains. Having established the proper environment through organizational policy and having delineated the characteristics and approaches which the supervisor must employ in dealing with his subordinates, there still remain certain factors which are a *sine qua non* if the development of the most productive work group is to occur. These entail such mutual relationships as:

1. *Establishment of group objectives.* The supervisor defines the place and function of the group in the total organization. He secures group participation in setting and agreeing on production goals. He institutes controls to mark and evaluate progress, stimulates competition and promotes a feeling of achievement.

2. *Recognition of mutual work problems.* All jobs, no matter how routine or uncomplicated will develop problems, bottlenecks or emergencies at one time or another. No supervisor need necessarily feel defensive about these. Rather, he may do a great deal to prevent, counteract or overcome them by allowing his group to share in and discuss mutual problems in the work situation. This not only enables him to take advantage of the ideas of those closest to the job but develops a feeling on the part of workers that there is freedom to speak, criticize, and, most important, contribute.

3. *Holding regularly scheduled staff meetings.* Nothing—but nothing—is as discouraging to a worker as the feeling that he is outside what is going on, that he knows perhaps the “what” but not the “why” of the job and the job environment. Agenda-planned, regularly scheduled staff meetings, led by the supervisor, with full opportunity for staff to participate in agenda, discussion and suggestion provide the most direct means of mutual communication. The group is given a chance to think jointly about work problems, policies and procedures. Subordinates receive the latest word from the most authoritative immediate source and the supervisor is kept up to date on what workers think and feel. Staff meetings become a superb medium for giving participants that essential sense of belonging which is so vital to most people.

4. *Keeping group informed of decisions.* The supervisor transmits to the group not only his own decisions but policies and decisions from above which he cannot control. Even where he cannot justify such decisions, the supervisor can at least explain them in terms of the total organization and its needs and give background, underlying reasons, etc. Not only does this policy of full information assist tremendously in the main-

tenance of good morale; equally important, it simultaneously avoids the circulation of rumor, unfounded gossip and similar means of creating possible unrest, dissension and dissatisfaction.

These types of relationships are, of course, neither exhaustive nor immutable. They are, however, designed to point up the possibilities which exist within any organization for developing and maintaining understanding and sympathy between supervisor and subordinate to the end that the common goal is achieved. It is as essential for the worker to see the job of the supervisor in his broad group and individual relationships as it is for the supervisor to remember and act upon the fact that workers are individuals, that they have a right to individual consideration, treatment and understanding. Only with such a common appreciation which, in the first instance, it is the supervisor's responsibility to create, can the group hope to become truly a productive one.

Reprinted from *THE OFFICE Magazine*,
November, 1951



How To Train

If the learner hasn't learned—the trainer hasn't trained!

Step 1—Preparation

- (a) Put employee at ease.
- (b) Introduce to others in department.
- (c) Find out what he already knows about job.
- (d) Get him interested, anxious to learn.

Step 2—Presentation

- (a) Tell, show, illustrate how to do job.
- (b) Question carefully and patiently.
- (c) Stress key points.
- (d) Instruct clearly and completely.
- (e) Take up one point at a time, but no more than employee can master.
- (f) Check . . . question . . . repeat.

Step 3—Performance

- (a) Have employee do job.
- (b) Have him *tell* and *show* you, explaining key points as he goes along.
- (c) Question employee as he demonstrates.
- (d) Observe performance, correct errors.
- (e) Repeat instructions if necessary.
- (f) Have employee repeat job until you are sure he knows it thoroughly.

Step 4—Follow-Up

- (a) Put employee on his own.
- (b) Check frequently to make sure he follows instructions.
- (c) Get him to look for key points as he progresses.
- (d) Tell him whom to see about his questions.

Continuous Reproducing Forms Save Tabulating Department Time and Money

TABULATING EQUIPMENT, the modern, mechanical information center of an increasing number of business firms, is just as rapidly becoming overtaxed in many companies. More tabulated work is ordered by more executives, departments, and operating personnel. To add to the problem, information is often needed in ten, twelve and more copies. These requirements are too great for the customary machine-paper-carbon combination.

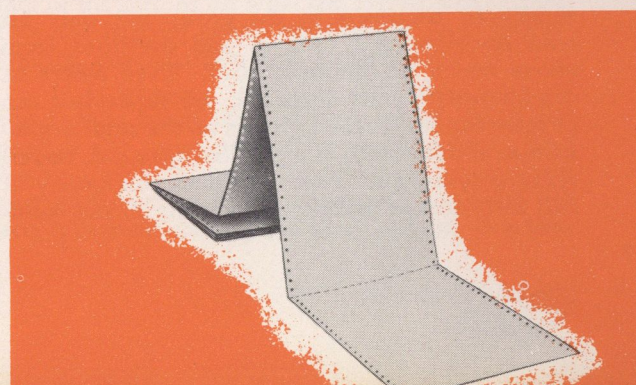
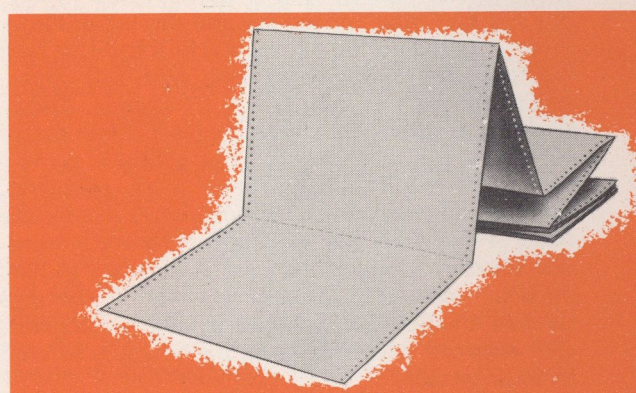
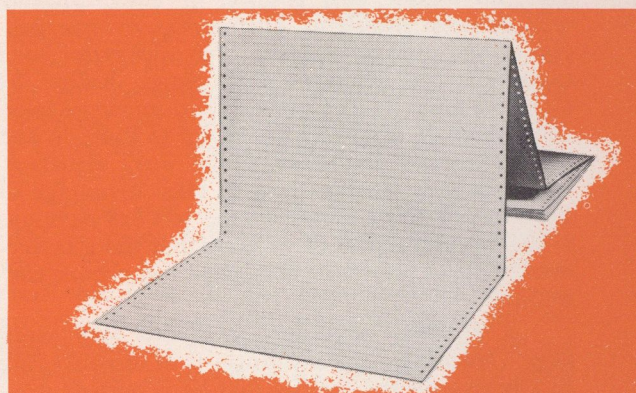
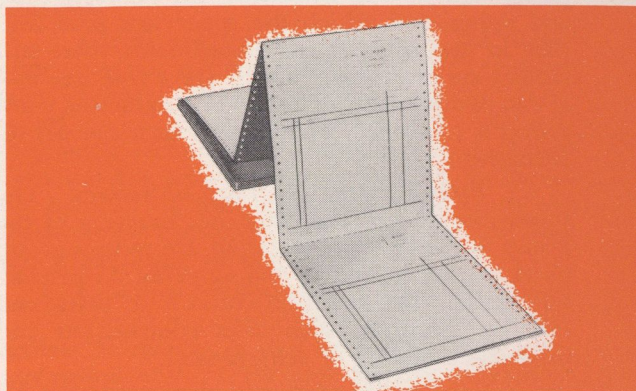
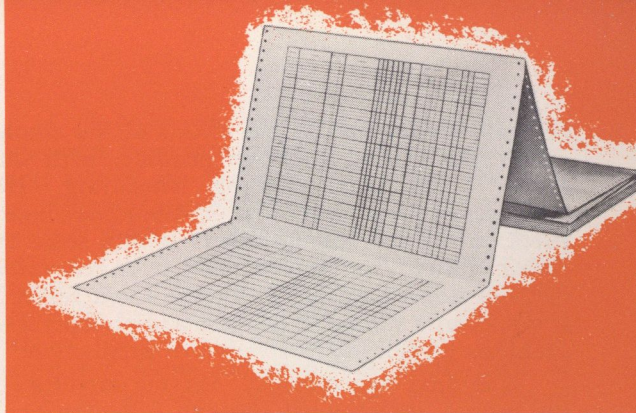
There are several methods of overcoming the obstacle of "too many copies," but some have limitations and glaring disadvantages. One way is to run forms through the equipment several times in order to obtain the number of copies called for; however, this doubles and triples tabulating time—eats into equipment availability for other reports and operations.

Many tabulating supervisors are acquainted with another way of obtaining copies, by the hectograph ribbon method that produces a master for spirit duplicated copies. The hectograph ribbon is guided behind the paper in first position, giving a hectograph master that will duplicate any reasonable number of copies. This represents a step in the right direction, but still falls short of being perfect. For one thing, the cost is higher than it should be, since the form must be preprinted on the copy paper. Then the hectograph master must be perfectly registered on the copy paper form—a hazardous and sometimes impossible operation.

When you need copies of tabulated information, you can use one method that is simple, inexpensive, quick and perfectly accurate—the continuous *preprinted* form on either paper offset plates or hectograph units. Which you use is governed by the duplicating equipment you have: offset multilith or spirit duplicator. Either has the same outstanding advantages:

1. Since the continuous *preprinted* form will duplicate in the same way at the same time as the tabulated information, you no longer need expensive, preprinted copy paper. Use plain paper and save money.
2. Since the tabulated information is accurately placed on the form by the tabulator, perfect registration is guaranteed. Remember—both the form and the fill-in information are reproduced at the same time, eliminating all registration problems. This is a real time saver.
3. No matter how many copies you make, the last copy is as legible as the first—no chance for errors caused by illegibility of "the last few copies."

Continued on Page 193

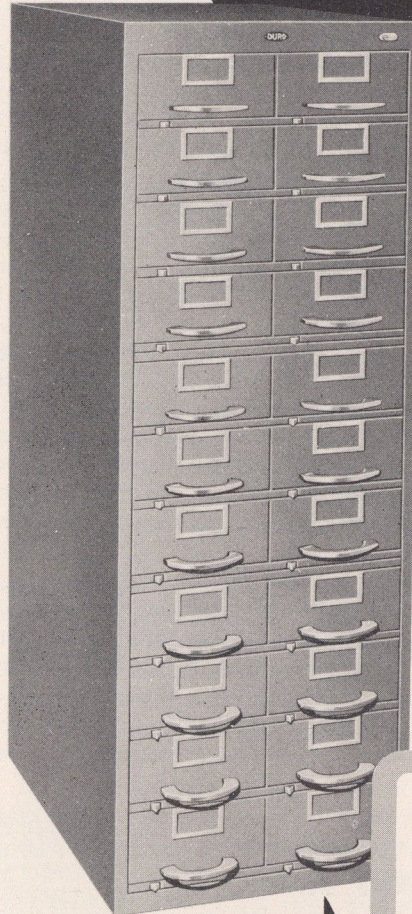


Critical Machine Load

Continued from Page 127

- (5) All other are code 9
- c. Run on Work in Process for checking of spacing only.
5. *Gang Punch*
 - a. Prepare 5 cards with units 1, 2, 3, 4, and 9 in column 80 only.
 - b. Place card with digit one in front of all Turret Lathe cards as determined from sort above; digit 2 in front of Engine Lathe; and so forth. All cards thus have a digit code for subtraction purposes.
6. *Sort*
 - a. Sort all coded labor cards, columns 38 to 32 and 6 to 1.
 - b. Hold
7. *New Master cards*
 - a. Obtained from B. 1(a)
 - b. Sort on columns 38 to 32 and 6 to 1.
 - c. Run on 405 for checking purposes. All cards must have X78 and hours must add across to total.
 - d. Sequence Check Sorted new Master Cards on Collator Authorization is primary control, Index is secondary.
 - e. Sequence Check beginning Master Cards to assure proper order. Same controls as above.
 - f. Merge Master Deck with New Masters.
8. *Merge Detail Elapsed Time Cards behind Master*
 - a. Summary Punch resulting merged deck.
 - b. Result is New Master Card with total credit in some cases. (Exhibit D). Some results are credit in individual columns. Some results are in order with no credit balances.
9. *Sort Resulting New Masters (Selective)*
 - a. Columns 25, 40, 50, 55, and 60; X only.
 - b. Removes Credit balances for further handling.
 - c. Interpret (Printing Key Punch) Summary Cards with Credit balances as determined above. (As shown in Exhibit D).
 - d. Remove credit balance from Master Cards by subtraction only regardless of estimate. Where credit balance is shown in any column, this column must be added to equal a zero balance. (Exhibit E).
 - e. Key punch New Master from corrected Master.
 - f. Merge newly prepared masters with deck from which they were originally removed.
10. *Closed Jobs*
 - a. Sort on columns 38 - 32 and 6 - 1
 - b. To Collator for purposes of removing closed Jobs from Master Deck.
11. Run Resulting New Masters on 405
12. File Master Deck of open jobs on hand until next report is due.

DURO'S Specialty—Fine Quality Tab Card Accessory Equipment



Useful, sturdy products that increase the every-day work efficiency of tab card users—this has been Duro's exclusive design and manufacturing goal for years.

Units of the new, all-steel Duro line . . . of which several are illustrated . . . give evidence throughout of careful workmanship and quality materials.

22 DRAWER TAB CARD FILE

Full extension, full ball bearing drawer suspension . . . positive latching drawer cradles. 20-3/32" wide, 28 1/2" deep, 54 5/8" high. Grey enamel finish. List \$295.00. Ship. wt., 400 lbs.

New KEY PUNCH DESK

Linoleum-covered steel top . . . grey enamel finish . . . 19" wide, 26" deep, 26 1/2" high adjustable to 28 1/2". List \$79.50. Ship. wt., 90 lbs.



DURO'S Reinforced DO-ALL

Full-swivel ball-bearing wheels, 21" turning radius . . . welded shelves, static load capacity 1,000 lbs. . . . grey enamel finish . . . 22" wide, 30" deep, 44 1/2" high. List \$72.50. Ship. wt., 90 lbs.



Write for new catalog of tabulating accessory equipment

Other Duro Products

Tote boxes, Tote box carriers and cabinets . . . control panel storage racks . . . sorter racks . . . cantilever office shelving.

Tabulating Accessories Div.

DURO CONSOLIDATED, INC.

Post Office Box 248-1 • Redwood City, California

REPRESENTED NATIONALLY BY LEADING OFFICE EQUIPMENT DEALERS

Streamlined Punched Card replaces Manual Postal Money Order

By Osborne A. Pearson,
Assistant Postmaster General,
Post Office Department,
Washington, D. C.

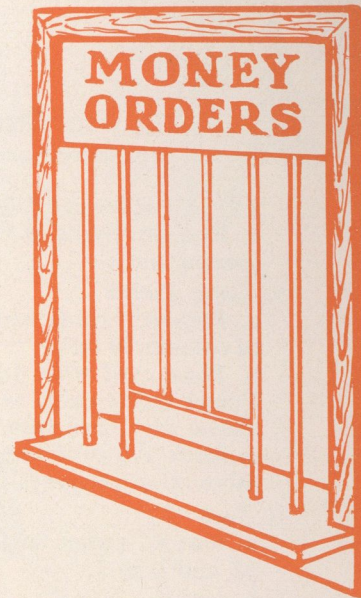
Electronic machines handle the new postal money orders that have simplified accounting procedures and produced greater accuracy at lower costs. The money orders, adopted after 5 years of study, are used in the 42,000 post offices.

ON JULY 2, 1951, a more convenient, more economical and stream-lined money-order system went into effect. A punched card that may be cashed at any post office or bank, the new money order continues to meet the needs of the American public for a safe and economical means of transmitting small sums through the mails.

The specially designed high-speed electronic machines, adapted by International Business Machines to handle money-order operations, eliminate much cumbersome record-keeping, simplify accounting procedures, and achieve greater accuracy at substantially lower costs.

This money-order system was adopted after 5 years of intensive study and experimentation in which our department officials and systems engineers collaborated in developing a more effective control over the hundreds of millions of small individual transactions handled annually by the country's 42,000 post offices. After establishing the advantages and economies of the punched-card form, the present system was inaugurated.

The old money-order system had been growing increasingly unwieldy and costly through the years. World War I and the development of new industries gave tremendous impetus to the commercial life of the country, and wider use of com-



The new is compared with the old in these pictures. The smaller punched card at the right is run through a special machine manufactured by IBM. The long, narrow money order, below, was costly and very unwieldy.

United States Postal Money Order
MAY BE CASHED AT ANY POST OFFICE
COLLECTIBLE THROUGH ANY FEDERAL RESERVE BANK

NOT GOOD FOR MORE THAN LARGEST AMOUNT CHECKED \$ 5 10 25 50 75 100

1-98,765,432
15-119
000

PAY TO THE ORDER OF _____ DOLLARS _____ CENTS

REMITTER _____

P. O. D. _____

PARCEL NUMBER _____

DO NOT FOLD, STAPLE, SPINDLE OR MUTILATE

United States Postal Money Order

PURCHASER'S RECEIPT

DETACH AND HOLD

SEE INSTRUCTIONS ON REVERSE SIDE

ISSUING OFFICE _____

STAMP _____

45431 03015 Anderson Dam, Idaho. 45431

OFFICE NUMBER SERIAL NUMBER

United States Postal Money Order
IDENTIFICATION REQUIRED

STUB

POSTMASTER AT _____

PAY AMOUNT STATED ABOVE TO ORDER OF PAYEE NAMED IN ATTACHED COUPON.
NOT GOOD FOR MORE THAN LARGEST AMOUNT INDICATED ON LEFT-MARGIN MARGIN.
ANY ALTERATION OR ERASURE RENDERS THIS ORDER VOID.

RECEIVED PAYMENT: _____

POSTMASTER

PAYING OFFICE STAMP HERE

Anderson Dam, Idaho. 45431

03015 OFFICE NUMBER

Coupon for Paying Office
HOLDER MUST NOT DETACH

PAY TO: WRITE WORDS FOR DOLLARS _____ DOLLARS _____ CENTS

FIGURES FOR CENTS

REMITTER: _____

C. O. D. _____

PARCEL NUMBER _____

ISSUING OFFICE STAMP HERE

45431

RECEIPT
FOR REMITTER
TO DETACH AND HOLD
SEE OTHER SIDE

ISSUING OFFICE STAMP HERE

mercial paper in all forms, including money orders, resulted. Revisions made then in the system improved the service, but during the ensuing years of World War II, the ready availability of money orders in every hamlet and town, at the front lines and on every naval vessel, set new records in the volume of money orders that were handled.

In 1943 alone, one year of World War II, money orders aggregating \$1 billion were issued at military branches, as against the \$25 million of such money orders issued during the entire period of World War I.

However, sharp increases in operating costs brought about a greater and greater difference between revenues from money-order fees and the expense of conducting the service, which resulted in a deficit of nearly \$30 million in 1949.

Concerned, our department studied suggestions from within and without for greater mechanization of money-order operations, but we rejected various forms of the punched card as impractical. As an experiment, we reintroduced a postal note in punched-card form in February 1945 and from this experience we were able to develop our future course in improving the mechanized money-order procedure.

The old money-order was printed in four component parts, and issued in books of 200 with separate series numbers for each individual post office as well as for branches and stations. The money order was drawn on a specific post office and could be paid only at offices of issue and paying offices. If presented for payment at other than the issuing office or the office on which it was drawn, a fee was charged. An application filled in by the patron was stamped by a numbering machine so that the money order and application had the same serial number.

A daily list of individual money orders issued was submitted by each postmaster with his monthly or quarterly account. About 90 per cent of the old money orders were cashed through banks which presented them to the local postmaster and were reimbursed in cash or by U. S. Treasurer's check.

Large post offices such as Detroit and Des Moines, where more than 500 money orders were paid daily, used an electrical tabulating service at a central unit where punched cards were prepared and a printed record of date and amount made. At small post offices a record was prepared by hand, the money-order coupon filed alphabetically by states and by name of post office to be referred to as searching record. Two complete records were prepared—one at the office of issue, the other at the office when payment was made.

Inaccuracies occurred frequently in listing the post-office number or serial number, making it difficult at times to find a record of payment. It was only after a money order is issued, for example in Omaha, Nebraska, finally got back to the general accounting office and was checked against the issuing postmaster's record that errors

would be found. In punching several hundred million audit cards annually, unavoidable errors in key punching created confusion in subsequent accounting procedures.

The system of collection was burdensome. The banks would send cashed money orders to postmasters for collection, and delays would occur if the post office was out of funds or not provided with checking facilities. Two months later the bank might have to write again for its money.

Another troublesome aspect occurred when a remitter's receipt was worn and the stamp erased. There was no way of identifying the post office that had issued it because each post office and station had its own cycle of serial numbers.

The new money-order system eliminates many of these problems. Now the system utilizes a money-order form printed on a tabulating card prepunched to designate a regional post office and serial number. Money orders are issued in much the same manner as formerly, except that they are not drawn on a particular post office. They may be cashed at any post office or bank within a period of 1 year, and they will be cleared through the Federal Reserve system like Treasury checks or other cash items and channeled for accounting purposes to 12 regional postal areas, conforming generally to the Federal Reserve districts.

As formerly, a purchaser submits an application for a money order at a post-office window, a numbered money order is issued, and the purchaser retains the receipt stub.

Cash is balanced daily, and the clerk submits a report of inclusive numbers of money orders issued, total amount, and fees.

Individual listing of money orders issued daily at the larger post offices has been discontinued as well as the individual listing of paid items. The troublesome "third-office" feature has also been eliminated, together with the examination of bank paid money orders. There are no paying office coupons to file, and searches for record of payment are made mechanically at the 12 regional accounting offices.

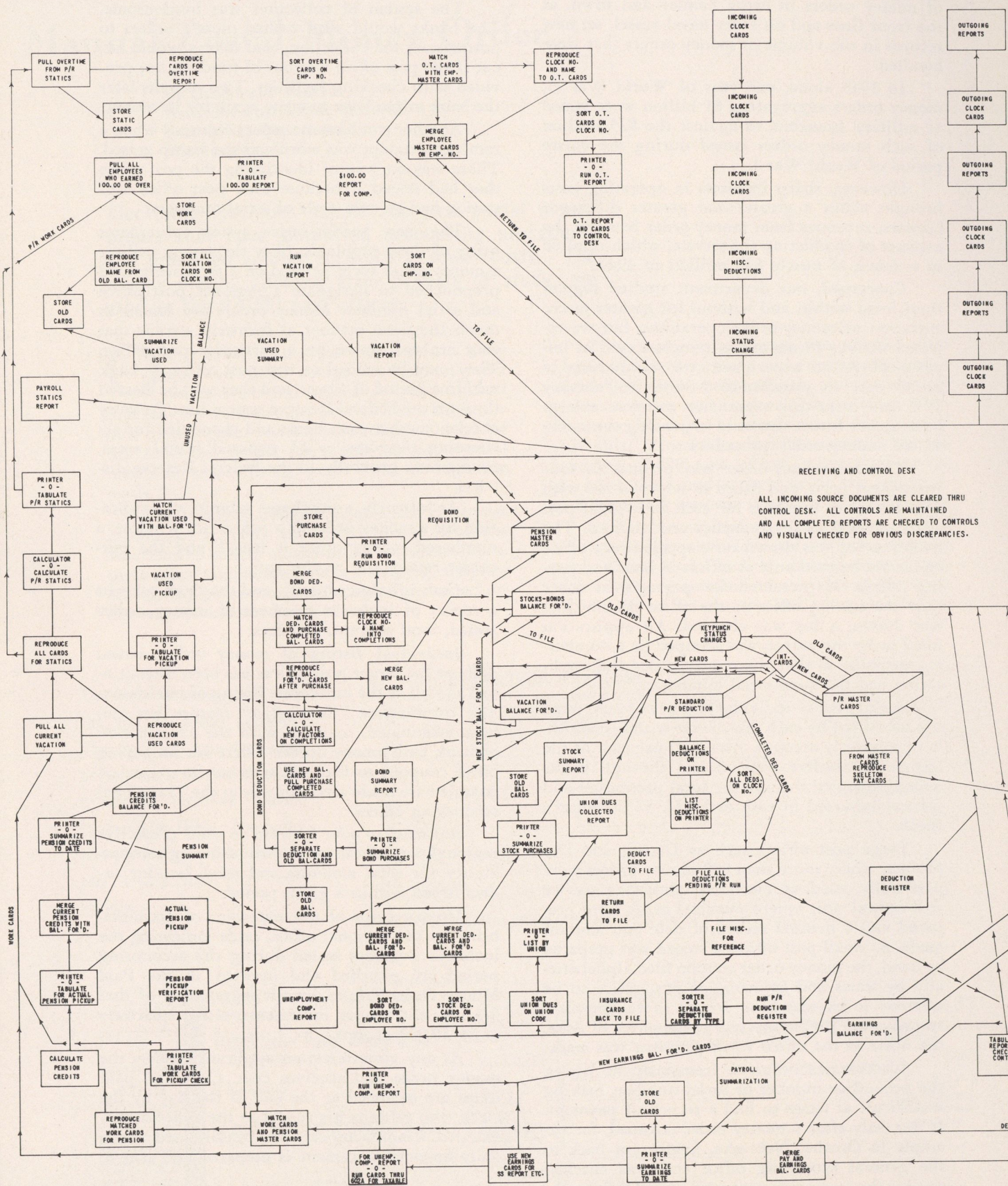
Postmasters now forward to their respective regional post offices a statement showing accountability for total amounts and total fees for orders issued within a given period.

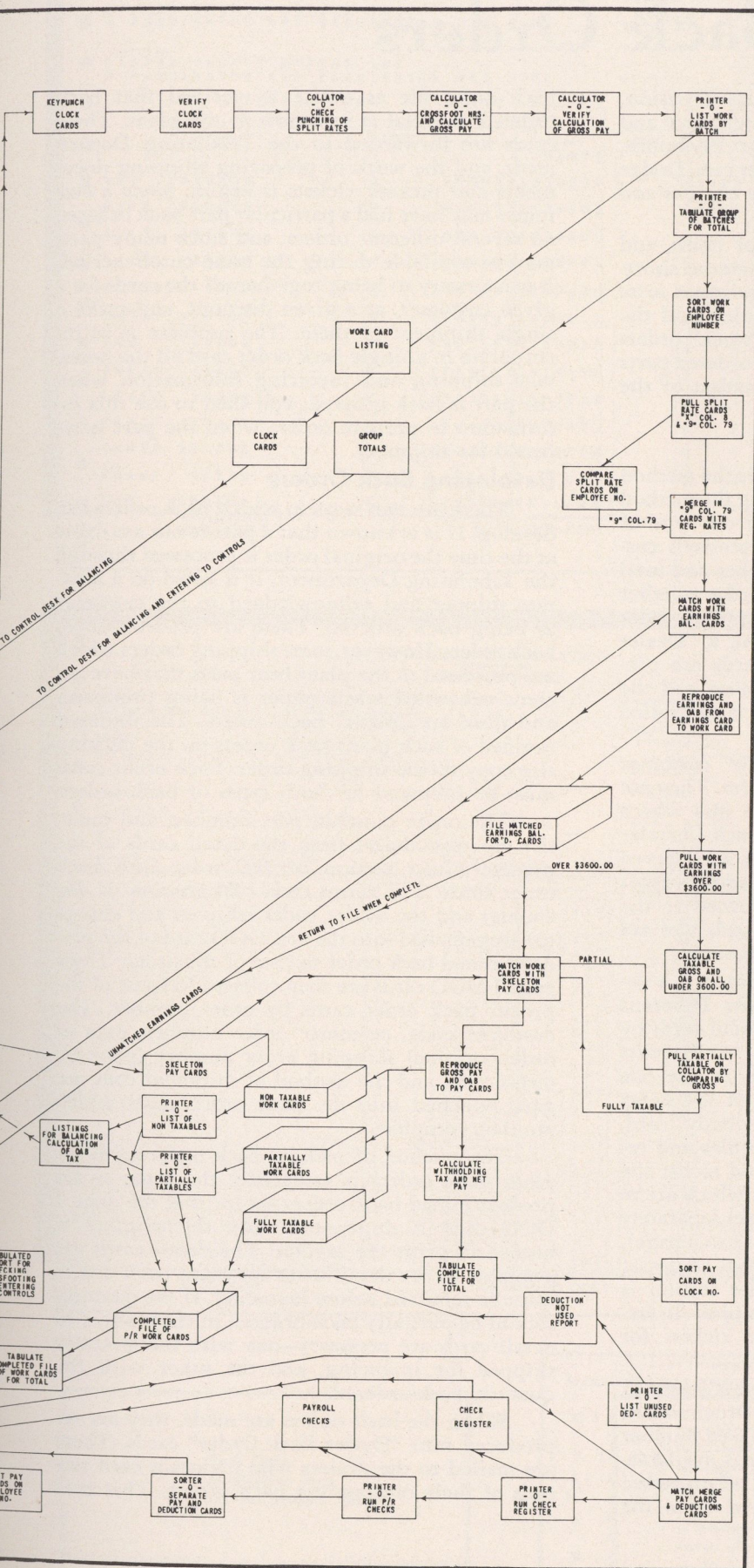
Upon receipt of the statement of accountability by the regional office, cards indicating the inclusive numbers issued during the accounting period are punched and inserted in the Paid Money Order File to permit segregation of that file into the proper increments, either quarterly or in 10,000 groups.

At any post office, an applicant tenders the money order and receives cash. Cash and paid items are balanced at the end of the day by the clerk who submits his report to the superintendent. All window reports are consolidated and a daily financial statement is prepared and sent to

Continued on Page 163

Hourly Payroll and Related Reports





The tabulating installation (IBM) at Dow Chemical is just two years old. Despite its infancy, this installation furnishes many of the reports in the business management of the company's operations. All the control panels used to effect these reports are wired permanently, using either switches on the cover or the semi-fixed type unit. This, in order to use each control panel for multiple reports. In this case, some of these reports are related and some are not.

1. Hourly payroll for 4,000 employees and all of the related reports.
2. Labor distributions for both hourly and salary payroll.
3. Work order cost accounting.
4. Material distribution.
5. Freight distribution
6. Automotive distribution which is comprised of 450 vehicles.
7. Personnel records.
8. Seniority records.
9. Magnesium production efficiency records.
10. Priorities records.
11. Sales records.
12. Group Insurance records.

Mr. G. S. Thomas is the manager of the tabulating department at Dow Chemical Company. Judging by the number of procedures that are effected in his department, he has done a most excellent job during the short lifetime of this installation.

. . . About the Company:

During Dr. Dow's short stay in Navarre, Ohio in 1895-96, he carried on his important experimental work in making chlorine and caustic soda. He was responsible for many inventions from ammeters to steam boilers and the first electrolytic cell. His foresight, courage and determination contributed greatly to breaking the European monopoly on the making of chemicals for both war and peace.

Back Orders

THE CHRYSLER CORPORATION—Parts Division, Newark, Delaware Parts Plant warehouses and distributes parts and accessories for Plymouth, Dodge, DeSoto and Chrysler passenger cars, Dodge "Job-Rated" trucks, Chrysler Marine engines and Chrysler Industrial engines.

In the handling of thousands of items, and especially during these times with material shortages, temporary exhausted stock conditions arise which result in Back Orders. To understand the back order procedure pertaining to "stock" orders and the method of releasing the back ordered parts as they become available, an explanation of the shipping document is required.

Shipping Document

The first line of the shipper shows the method of shipment; various codes designating the method of shipment, the type of order, and the type of customer; the date the order was received; customer's order number; the page number and total pages (1 of 10, 2 of 10, etc.); our order number (for control purposes) and the shipping order number. This first line is listed from a "Dealer Order Data" (DOD) card. These cards are pre-numbered as to shipping order number and the issue of shipping orders and invoices is controlled by the pre-punched numbers.

The "Ship To" and "Charge To" customer names and addresses follow on the form. They are listed from cards removed from tub files which contain name and address cards for each Chrysler Corporation authorized dealer in the area served by the Newark Plant. The name and address cards are used for an order and then returned to the tub files to be used again. Cards in tub files are maintained in order by dealer code number.

The first line in the body of the form is a description of the type of parts to follow. Different types of parts are designated in the detail cards by a code called an "order split" (O.S.). Only parts for a single order split may appear on any one page of a shipper. This description of the order split is listed from a card known as a "body" card, and these too are maintained in tub files and reused. The balance of the form is used to list the various parts from detail cards. Parts which are to be back ordered are listed (25 to a page) separately from parts which are to be shipped (13 to a page). The customer receives acknowledgment copies of both; the original of the back order section is filed; the original of parts to be shipped is forwarded to the plant with pickers' tickets for processing.

For each part back ordered, a card is prepared for the Procurement Department. A Procurement Department back order file is kept in part number order so that as a given part becomes available, the back orders held against it can be processed for shipment. The cards are removed from the

back order file as notice is received that back ordered material is in transit to the plant. These cards are forwarded to the Tabulating Department, and the work of preparing shipping documents and pickers' tickets is begun. Since a customer may have had a particular part back ordered on several different orders, and since many parts may be available during the same cutoff period, it is necessary to bring together all the cards for a given customer, at a given discount, and make a single shipment of them. The problem is to incorporate in a single back order card all the necessary shipping and invoicing information when the part is back ordered; and then to use this information to prepare orders when the part is released for shipment.

Developing Back Orders

There are two ways in which back orders can develop. If it is known that a part is not available at the time the original order is processed through the Tabulating Department, it is listed on a separate shipper and acknowledged to the customer as being back ordered. These are predetermined back orders. However, some shipping orders which are processed to the plant bear parts that have become exhausted while paper is being processed, and these are "plant" back orders. The dealer is notified of such plant back orders on the packing slip copy of the shipping order. Back order cards must be prepared for both types of back orders.

The order number, part number, and quantity are reproduced from the detail cards of the predetermined section of the order into back order cards. The terms code (designation of discounts) and the dealer codes (ship to and charge to) are punched into the first DOD card of the predetermined back order section of the order. These page 1 DOD cards are then collated in front of the proper back order cards by order number. The customer code, customer order number, date of order, original shipping order number (page 1), terms code, and the method of shipment code are gang-punched into the back order cards which are then complete.

The method of making back order cards for plant back orders is essentially the same as for predetermined back orders except that the page 1 DOD card is duplicated since the original is needed to print the invoice. The detail cards are available as the detail cards for plant back orders must be removed before invoicing. If the quantity should be partially back ordered in the plant, two detail cards are necessary—one with the quantity shipped for invoicing, and the other with the quantity back ordered.

When the back orders are made, they are reproduced into "Dealer Back Order" cards. These are mailed to the dealers who maintain card records of their outstanding back orders. This card

CHRYSLER CORPORATION
PARTS DIVISION
NEWARK, DELAWARE

FORM NO. 1000
REV. 10-67 DL

SHIP VIA **PREPAID STOCK** CODES **H42 BQ REL** DATE RECEIVED **BELOW** YOUR ORDER NO. **2007** PAGE NUMBER **2007** OUR ORDER NO. **63578 DL** SHIPPING ORDER NO. **722770**

SHIP TO **DAWSON COUNTY MOTORS INC**
WASHINGTON AVE WASHINGTON NEW YORK
84137

CHARGE TO **DAWSON COUNTY MOTORS INC**
WASHINGTON AVE WASHINGTON NEW YORK

P.P. ZONE **53660 09** **84137** **11** **01**

YOUR ORDER CHGD. TO DEALER CODE D.S. CODE

BACK ORDERED QUANTITY PRICE AMOUNT

A back order
release Shipping Order.
*Indicates items
back ordered on other
sample shipping order.

PART NAME	VENDOR CODE	PART NUMBER	LOCATION	BACK ORDERED	QUANTITY	PRICE	AMOUNT
PART 8							
NUT AB2222	G	178778	1532027	48468	360	888	
PIPE AB2222	F	627487	1725A05	33456	51	176256	
BOLT AB4566	G	854472	1536B20	4	4	04	16
VALV AB232 *	G	898446	1525F24	2	1	413	413
SCREW AB22	G	1095367	1537C20	46352	05	31760	
KNOB AB8989	K	1149807	1858A11	29875	35	345625	
ARM BA232	D	1261557	0728D30	2	1	809	809
SPRIN AB122	F	1313193	1916A32	6	5	10	50
LEVER AB232 *	F	1343745	1528E19	2	3	62	186
FENDE AB456	H	1364830	1376A01	9	9	1039	9351
CARTR AB2356	G	1405639	1540A09	2	7	61	427
FRAME AB232 *		1435215	REC DPT	1	6	290	1740
NUT AB1234	F	1439758	1525D24	4	1	07	07

THIS NUMBER FOR CHRYSLER
USE ONLY. NOT TO BE
USED FOR REFERENCE.

6-VENDOR COPY

567528*

CHRYSLER CORPORATION
PARTS DIVISION
NEWARK, DELAWARE

FORM NO. 1000
REV. 10-67 DL

SHIP VIA **PREPAID STOCK** CODES **H32** DATE RECEIVED **030252** YOUR ORDER NO. **AB232** PAGE NUMBER **3012** OUR ORDER NO. **562703 DL** SHIPPING ORDER NO. **716432**

SHIP TO **DAWSON COUNTY MOTORS INC**
WASHINGTON AVE WASHINGTON NEW YORK
84137

CHARGE TO **DAWSON COUNTY MOTORS INC**
WASHINGTON AVE WASHINGTON NEW YORK

P.P. ZONE **12232 00** **84137** **11** **01**

YOUR ORDER CHGD. TO DEALER CODE D.S. CODE

BACK ORDERED QUANTITY PRICE AMOUNT

Predetermined
back order section
of a Shipping Order.

PART NAME	VENDOR CODE	PART NUMBER	LOCATION	BACK ORDERED	QUANTITY	PRICE	AMOUNT
PARTS							
BOLT	F	595529	1528H28	804	12	63	756
CUP	F	698415	1718A02	803	1	157	157
COVER	F	855518	1525B10	802	4	167	668
VALV CONT	F	898446	1525F24	802	1	413	413
SEAL WEATHR	F	1097556	1522K15	802	5	61	305
BAR	C	1115456	0593013	802	25	1634	40850
PIPE	B	1194158	0603A11	803	15	304	4560
RAIL	F	1196836	1527K15	803	6	173	1038
STOP RING	F	1196894	1554026	802	6	197	1182
RAIL	F	1196900	1527E18	803	1	319	319
CONTROL	F	1261045	1520E11	802	2	88	176
ARM	U	1261556	0728B64	802	1	809	809
ARM	U	1261557	0728D30	802	1	809	809
YOKE-PLUG	U	1263408	1914A34	802	1	722	722
STUD	F	1273576	1523B07	802	18	17	306
GRILLE	U	1335339	HP DPT	803	4	3584	14336
LEVER	F	1343745	1528E19	802	3	62	186
COVER	F	1373468	1536E02	802	1	110	110
GASKET	F	1405834	1522E18	802	30	10	300
FRAME	F	1435214		801	6	290	1740
MOULDING	F	1435517		801	6	290	1740
MOULDING	F	1435517		802	3	140	420
HANDLE	F	1435518		802	6	140	840
LID DECK	G	1450156	1537E16	802	7	40	280
		1477816	2243015	807	4	2549	10196

THIS NUMBER FOR CHRYSLER
USE ONLY. NOT TO BE
USED FOR REFERENCE.

6-VENDOR COPY

83212

Back Order
notification card
for the dealer's file.

DL COC4 01477816 LID D 01338609 AE232 03 02 52 84137 CCO

CHRYSLER CORP. - PARTS DIV. CHRYSLER MOTORS PARTS CORP.

THIS IS YOUR BACK ORDER RECORD

- Stock of this item is temporarily exhausted but will be shipped as soon as available.
- File this card in numerical sequence of Part Number.
- Remove this card from the file when complete quantity is received; in case of partial shipment against this Back Order a new card indicating balance due will be sent to you.
- All communications regarding this Back Order should be addressed to the Parts Plant with whom original order was placed mentioning quantity, part number, part name, and your order number.

DO NOT FOLD

USE NO STAPLES

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record of the back order is in addition to the customer's acknowledgment of the predetermined section of the order and/or the "BO" notation on the packing slip. The back order cards are sorted to part number, tabulated to obtain figures for back order reports, and forwarded to the Procurement Department for filing.

Control Figures Established

As the Procurement Department receives notice that back ordered material is "in transit" cards are removed from their file and sent to Tabulating for summarization by part number for back order reports and to establish control figures. At this point, a single detail card is obtained for each part. The detail card is used to gang punch the order split into the corresponding back order cards. The order split is not punched when the back order cards are made because it could change between the time the part is back ordered and the time it is finally shipped. The cards are held until the parts arrive in our plant. The Tabulating Department is then notified to release the cards for the preparation of shipping orders.

At the cut off time, a consolidated report of all parts released is made by means of the summary cards prepared when the cards were first received from the Procurement Department. The total on the consolidated report is balanced to the totals of the individual summaries. All the back order cards included are sorted to separate "prepaid" from "collect" shipments. No attempt is made to further define the method of shipment, since the accumulated parts may be either larger or smaller than any one of the original orders, and so all back orders are shipped "best way."

The cards are then sorted to order split, terms code, and finally, dealer codes. As the "ship to" and "charge to," dealer codes are usually the same, only one is sorted and the few that vary are pulled in the Collator and inserted by hand. At this point all the cards for a given dealer have been brought together, and the cards for each dealer are in order by order split and terms code. A block of "our order numbers" has been reserved for back order releases. These are assigned by collating prenumbered "our order number" cards among the back order cards. An order number card is placed between the cards with the same terms code for each dealer. These order numbers are gang punched from the prenumbered cards into the back order cards.

A list is made of the orders showing the dealer codes and all the detail for each order number. As the list is prepared, a minor control break occurs each time the order split changes or a two digit counter reaches 13; an intermediate control break occurs as the order number changes. Total items for each page and a grand total number of items are carried on this list. The grand total is balanced to the total of the consolidated report. During the listing, DOD cards for the orders are summarized. Since the "collect" and "prepaid" cards are handled separately, and the only shipping instruction required is either "collect" or "prepaid," either of these is gang punched. The type of dealer code is summarized, and the type of

order code is gang punched 4—back order release. In the columns reserved for Date Received, "BO Rel" is gang punched; and in the Customer Order Number field, the word "Below" is punched. Since the dealer order numbers will be varied, they will be listed in the body of the form as outlined below.

The page number is summarized by means of a progressive total arrangement, but the total pages cannot be punched at this time as the machine cannot anticipate the total number of control breaks in an order. The "our order" number and order split are summarized from the cards, and the shipping order number is prepunched as always.

When this list is finished, the DOD cards are listed. There are several uses of the DOD list, but first of all, it is a pulling medium to remove the necessary name and address cards from the dealer tub files. The total page numbers, together with X's required in the page 1 cards, are punched into the DOD cards by means of a single upside down run through the 604-521.

With DOD cards complete and name and address cards ready, there remain only detail cards to be prepared. One detail card for each part—containing in addition to part number and name, the prices, order split, and location—was pulled when the cards were first received from Procurement. If the material is to be "pegged" for the back order release and therefore not sent to the regular location, this special "pegged" location is substituted for the normal one in the single detail card per part. A second set of these detail cards is reproduced and X's punched to permit both to be used as master cards in the 519. One set is placed in front and one in back of the back order cards and they are sorted to part number.

Detail Card Reproduction

Detail cards for the back order release are made in the 519 by reproducing the part number, quantity, our order number, and customer order number from each back order card at the same time the part description, prices, location, etc. are gang punched from the corresponding master card. In back order releases the description field is reduced from 13 columns to 5 in order to provide a field for the customer order number. Because both the master cards and the back order cards are fed into the "read" side of the 519, the gang punched information must be selected between the comparing and punch brushes. Therefore, only that information punched from the back order card is compared. However, having master cards before and after the back order cards for each part, it is possible to compare the gang punched information by means of the Collator which is much faster than a separate comparing operation in the 519.

The detail cards having been made, there remain only the multiplying operation (quantity times price) and final assembly of the cards. The assembly of the cards entails some unique machine applications and therefore is described. After being multiplied, the detail cards are sorted to our order number and then order split. The DOD cards are

also sorted to order split. DOD cards are collated in front of the detail cards by our order number; but since there could be more than thirteen items for a given order split (and therefore more than one DOD card), a count is used to insert a new DOD card after thirteen detail cards even if the our order number does not change. While the various order splits are separate, a body card (order split description) is inserted between the DOD card and the detail cards for each page. The cards are then merged so that all the cards for an order are together. The last operation in the assembly of the cards is to merge the name and address cards between the DOD cards and the body cards. This is done by feeding four cards (ship to name and address, charge to name and address) behind each DOD card. The dealer number is compared between the DOD card and the first name card and between the first name card and each succeeding name and address card in the set.

The shipping orders and pickers' tickets for back order releases are made in the same manner as regular orders. The shippers are checked to the detailed list and the total items of each order balanced to the total on the list; thus the orders are proved to the control established when the cards first entered the machine operation.

THIS is a 604 wiring diagram and program chart for what is considered a unique application. Summary cards are prepared for each page of a group of orders. The page number is summarized by means of progressive totals, but the "Total pages" for each order is also required so that subsequent reports can show 1 of 10, 2 of 10, 3 of 10, etc. There is no way to summarize this "total pages" field; since, until the last page is done, it is impossible to determine what it should be. To accomplish this "total pages" punching, the cards are fed into the 604 upside, that is, face up, 9's first. Thus, the last card can be recognized because it will be immediately preceded by the page 1 card of the previous order. A page 1 dummy card is also placed in front of the group at the start so the first card will be recognized as the last of a group. The 01 punching in the first card is read as 76 since the cards are upside down. In addition, an R is punched into column 47 and an X is punched into column 56 in all page 1 cards.

Page numbers are prepunched in columns 42 and 43 by summary punch, total pages are punched during this 604 operation in columns 45 and 46. In addition, an R is punched in column 47 and an X in column 56 of all page 1 cards.

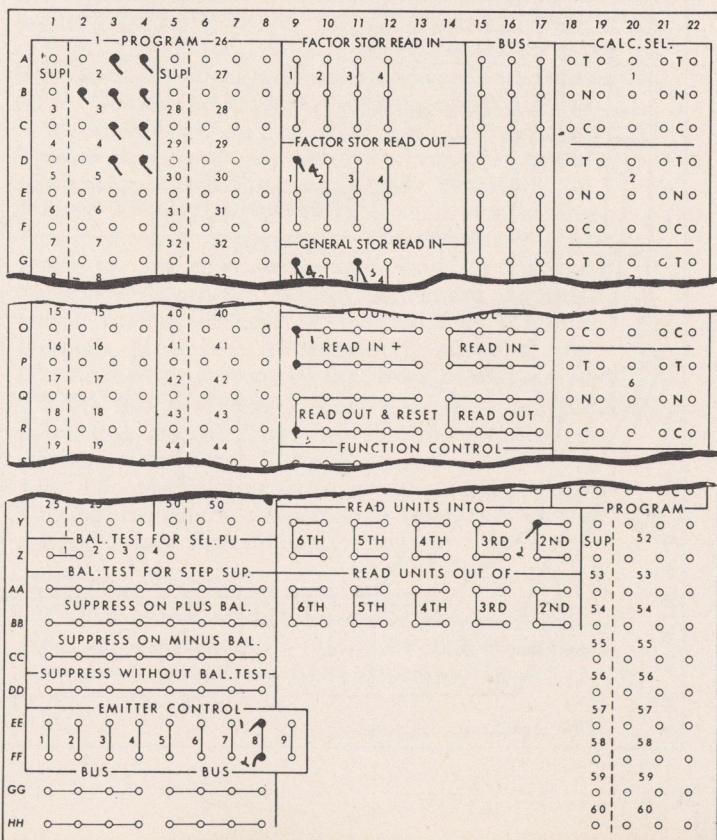
1. The machine recognized the page 1 card by 76 punching (01 upside down), and pilot selectors 1 and 2 are transferred when the page one card is at the punching station which is the same time the last page card of the following group is at the first reading station. Thus, if both of these selectors are transferred, factor storage No. 1 reads in the total pages of the new group, and general storage No. 3 reads out for punching X's (upside down 8's) into the page

1 card. These 8's are available in general storage by use of the emitter control in the calculator plugboard.

2. Since the cards are fed upside down, 8-9 are read as 11 and 12 punches and cannot be carried into factor storage. Pilot selector 3 is picked up on an 9 (upside down 12), and pilot selector 4 is picked up on an 8 (upside down X) permitting a hot 11 or 12 to get across to punch whenever a page number is either 8 or 9 in the units position. In the work for which this application is used, the total field will not go beyond 79 so no selection is done for the tens position. If this were not the case, selection of 8's and 9's in the tens position would be needed which would require a sixth pilot selector.

3. To make 9's (upside down 12's) available for the two times they are needed—once to punch page 9's as explained in paragraph 2 and once to permit the R punch in column 47 on all page 1 cards—a digit impulse is wired through the column split making both 11 and 12 available. This 11 and 12 wire is then taken through normal of selector number 7 which is transferred at X time allowing only the 12 impulse to get through. This 12 impulse is the upside down 9.

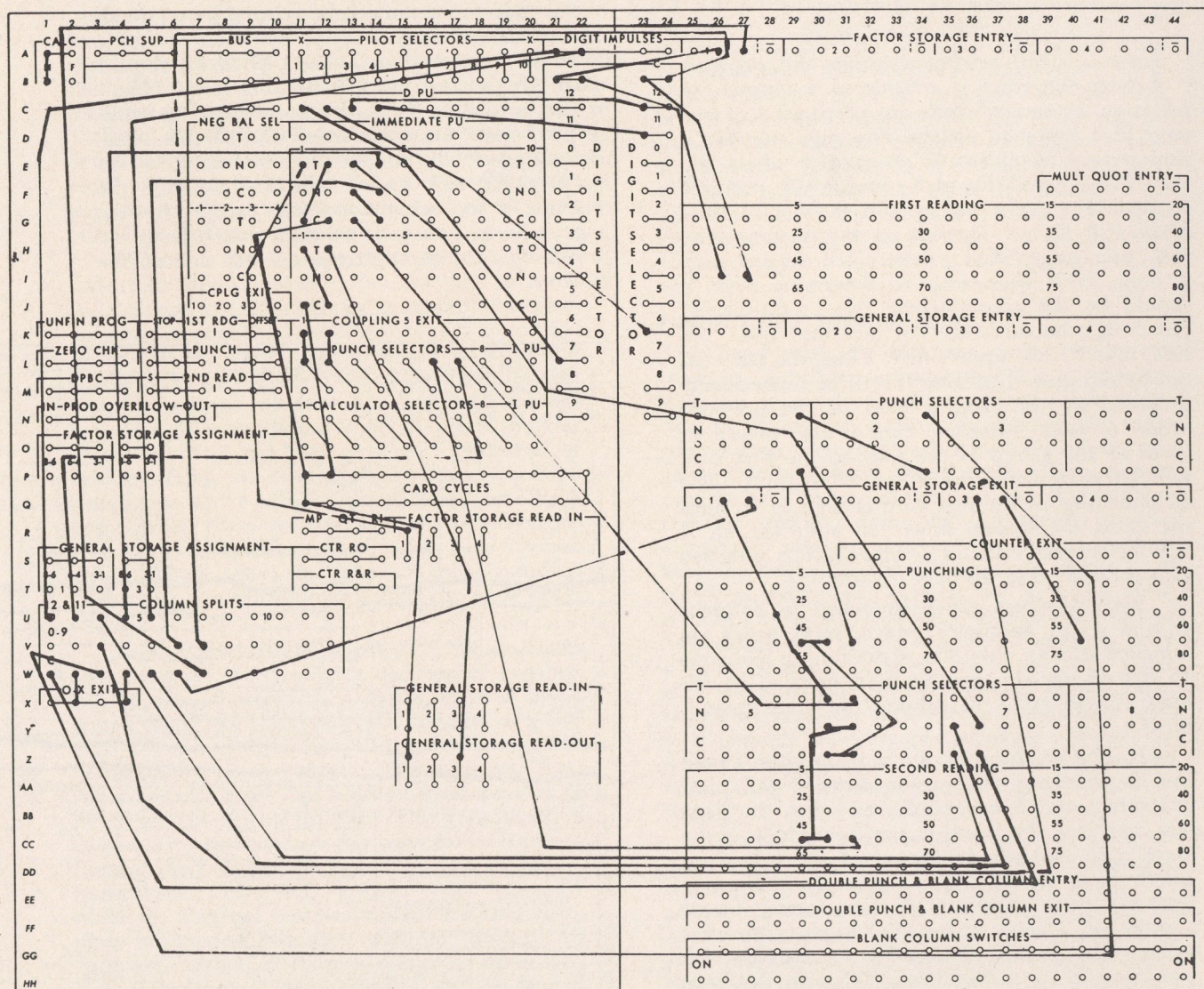
4. Selector number six is transferred from the second reading brushes by the 9 (upside down 12) punched in column 47 of all page 1 cards. By wiring from general storage No. 1 or the hot (8 or 9) punches described in paragraph 2 into the transferred side of this selector, we punch the proper page number into the last page of each group (the first through the machine); and when anything except the last page is being punched, we gang punch from the preceding card through the normal side of the selector.



[illegible]

18		18		18
19		19		19
20		20		20
P	PUNCH	P	These figures are available for punching but are selected as outlined	P
			47 88	

INTERNATIONAL BUSINESS MACHINES CORPORATION



Work Simplification

Continued from Page 41

three sheets of paper and two sheets of carbon, jogging them into alignment, inserting them in the machine, positioning them in the machine, removing and separating them after the typing operation, are all non-productive. The only productive part of the operation is the actual typing when the information is put on the paper. Long moves from desk to desk and delays on the desk are non-productive elements in Paperwork procedure. The first objective then is to reduce the non-productive elements in our Paperwork to an absolute minimum.

Smooth Flow

The second principle is: *Activity should be arranged to provide smooth flow from operation to operation in a process or a balanced motion pattern for an operator at work place.* Everybody knows how discouraging an unduly heavy work load can be to the average worker. Worrying about getting the work out distracts attention from the job at hand and slows up the actual production tremendously.

On the other hand, the average person is much happier when busy than when looking for work. This was illustrated very forcefully by an experience in the invoicing department in a large corporation. Application of Work Simplification, particularly the first principle, had cut the work load in half in the Typing Department. The typists who should have been released by this reduction in work, were badly needed in another department. However, the supervisor, accustomed to being measured by an all too common standard of how many people he supervised, could only see his empire being cut in half. The typists, afraid that some of their group would be worked out of a job, stretched out the work to appear busy. Quality fell off, discord crept in, till the department was thoroughly disorganized. When, finally, half the girls were transferred to other work, production more than doubled, quality rose to its highest level, and all the girls, honestly busy, were much happier in their work. Smooth flow or balance is important especially in Paperwork.

Simplicity

Our third principle is: *Activity should be as simple as possible.* In examining countless Paperwork systems in business and industry, I have been reminded of Rube Goldberg's cartoons illustrating extremely complex and involved ways of accomplishing very simple results.

The study of a receiving system in an industrial plant illustrates how the simplifying of Paperwork activity can also facilitate elimination of many elements of waste in productive functions. The objective of the system was to provide facts regarding thousands of items received, to aid in control of the quantity and quality of materials received, facilitate the storage and prompt availability of the materials to the proper production department, relieve procurement of further responsibility, enable Accounts Receivable to pay for the materials and to help the Cost and other

departments carry out their functions. The old system, which had grown up over the years to meet varying requirements, included three separate forms which had to be written for each shipment (involving seven copies all together) and a 10-copy summary of all shipments received which was used to advise the interested parties. Because the information had to be written four times, there were many errors in transcription and long delays before the summary could be completed. The laboratory, which was supposed to control the quality of many of the items received, frequently did not receive its copy of the summary report until the items were already being used.

In many cases, department heads had to search through 30 or 40 items on the summary sheet to find whether or not the item in which they were interested had been received. In the various accounting departments, the use of the summary report added substantially to their work and severely handicapped their functioning.

A simple eight-part form completed immediately after the receipt of the shipment eliminated rewriting the information three times, with the three opportunities for transcription errors; advised all interested parties promptly as to the receipt of each shipment; enabled the laboratory to test required items for quality before they had been used; and saved many hours of unnecessary work in purchasing, production and accounting departments. As in this case, it is almost invariably true that simplification through elimination of waste improves not only production but quality as well.

These three principles covering the technique of Work Simplification are simple enough to be understood and used by the average person to measure the effectiveness of almost any work activity. These principles, and the technique are, as can be seen, a simplified version of Motion Study. Contrary to many mistaken concepts, Motion Study as conceived by the Gilbreths, is not limited to the activity of an individual at a work place. One of the most important tools of Motion Study, developed by Frank Gilbreth, is the Flow-Process chart, a simple device for visualizing and measuring, chronologically, every detail in an over-all process or procedure. It is, in reality, the "steam-shovel" approach to the elimination of waste as compared with the "hand-shovel" or "teaspoon" approach used in examining the individual operation. Each of the so-called laws, or methods, of making Motion Study effective, may be classified under one of the three principles.

As usual, we have three principles for the mechanics and only one left to cover the important part of Work Simplification — the human side. The emphasis must be in the opposite ratio. The human relation aspect is at least 75% of the job in Work Simplification.

Personal Interest

The fourth, and by far, most important principle is: *Participation, built on understanding, stimulates interest, initiative, imagination and re-*

Continued on Page 193

Stock Status

By Eugene Stouder

THE PURPOSE of the Production Control Stock Status is to provide a weekly running status report of all manufactured parts. Basically, information flows from the Production Control Department to the Tabulating Department where it is punched into cards, tabulated, and returned in printed report form.

To accomplish the change-over from hand-posted card records to stock status, the following steps are necessary:

1. *Punch master cards for all parts and their respective part descriptions.*

2. *Correct by hand, the tabulated report of this punching.*

3. *Punch cards for the opening balance.*
This opening balance consists of the following information:

(a) An order—number of pieces in process of fabrication.

- (b) Requirements—number of pieces actually required year-to-date to fill customer orders.
- (c) Shipments—Number of pieces actually shipped year-to-date on Customer orders
- (d) Inventory balance — number of pieces actually in stock.
- (e) Available—number of pieces in stock or in process over and above unfilled customer requirements. This quantity is found by the following equation:
available = On order + Inventory Balance + Shipments—Requirements (or)
On order + Inventory Balance — (Requirements - Shipments)

4. *Correct by hand the tabulated report of this punching.*

5. *Establish a series of numerical codes for handling the necessary transactions.*

6. *A trial period is necessary during which time the original cards are kept up to date by hand posting. Upon the receipt of the weekly report the cards are used as a check, part by part, against the Stock Status.*

7. *When satisfaction of the stock status being correct is achieved, the cards are discontinued and filed for reference purposes only.*

8. *In order that a more accurate knowledge of production orders in process can be maintained, a file of one copy of each production order is kept in numerical order by part numbers. Upon completion of a production order, its copy is removed and destroyed.*

Stock Status Report

PART NO.	DESCRIPTION	C O D E	REFERENCE	ON ORDER	REQUIREMENTS	SHIPMENTS	AVAILABLE	INVENTORY BALANCE	MINIMUM QUANTITY
10 100 10 11									1250
	DESCRIPTION HEADING CARD		OPENING BALANCE	5000	450	900	9650	4500	
		1	PRODUCTION ORDER	500 +			500 +		
		2	DELIVERY TO STOCK	500 -				500 +	
		3	REQUIREMENTS		300 +		300 -		
		4	SHIPMENTS			500 +		500 -	
		5	PRE - PLANNED REQUISITIONS		400 +		400 -		
		6	REWORK D.M.	350 -				350 -	
		7	RETURN TO STOCK		200 -	200 -	200 +	200 +	
		8	FILLED REQUISITIONS			400 +		400 -	
		9	CUT RACK		500 +	500 +	500 -	500 -	
				4650	1450	2000	9150	3950	

STOCK STATUS ADJUSTMENT

DATE JUNE 8 1952

PART NUMBER	COLOR HAND EXACT LENGTH	DEGREE CAPS	CODE	ORDER NUMBER, REFERENCE, ETC.	QUANTITY
15-110-10-11			3	K-22785-1	750
45-467-10-11		90	1	272465	500
50-502-10-11			11	273030	11
66-104-00-00			6	272486	20
55-100-69-69	1		11	K-30409-1	5
45-350-10-11		105	1	767720	22

Type Of Information	Code	On Order	Rec.	Avail.	Shp.	Inv.
Production Order	1					
Cut Reports (Cut to length)	2					
Shop Written Requisitions	2					
Requirements	3					
Production Requisitions (Order ref. To Shop)	3					
Door Part Requirement Book	3					
Pre-Planned Requisitions	3					
Change Notices (Additions to order)	3					
Shipments	4					
Requisitions Filled	4					
Cut Reports (Door Parts, Showcase Door Parts, etc.)	4					
DM-Material In Stock (rework) (Pink)	5					
DM-Material In Process (Scrap) (white)	6					
Return Material (Customer) (this year)	7					
Return Material (Shop) (Order Cancellation)	7					
Returned Material (Customer) (Last year)	8					
Returned Material (Shop) (Unknown Surplus)	8					
DM-Material In Stock (Scrap) (White)	9					
Production Order Complete	10					
DM-Material In Process (Rework) (Pink)	10					
Change Notices (Deletion from order)	11					
General Adjustment	12					
General Adjustment	13					
General Adjustment	14					
Maximum Capacity (Warehouses)	15					
Accumulative Shipments Sent to Warehouses	16					
Cancellations, Returned Matl. etc. (Warehouses)	17					
Warehouses Shipments	18					
Warehouse Requirements (Cancellations)	19					

STOCK STATUS REPORT
 THE KAWNEER COMPANY
 NILES, MICHIGAN

PART NO.	FR. IN COLOR LENGTH	ORDER	DESCRIPTION REFERENCE	OF ORDER	REQUIREMENTS	SHIPPED	AVAILABLE	INVENTORY BALANCE	MINIMUM QUANTITY
53 282 10 11			GLASS STOP	524	3741	2578	1619	2258	1780
53 282 10 12			DOOR GLAZING	100	5		95		30
53 288 10 10			SDL BASE 2		CR		600	600	15
53 290 10 11			FRAME MEMBERS	11	420	326	78	161	441
53 290 10 13			FRAME MEMBERS	16	81	23	19CR	23	
53 291 10 11			FRAME MEMBERS	225	188	101	134	4CR	46
53 291 10 13			FRAME MEMBERS		2		9	11	999
53 292 10 11			FRAME MEMBERS	115	399	481	130	67CR	406
53 292 10 13			FRAME MEMBER		CR	40	20	7	
53 295 10 11			FRAME MLDG						

Minimum quantities for each part carried on the Stock Status are established by the Staff Assistant to the Production Control Manager with review by the Production Control clerks.

The Tabulating copies of all orders except special door orders are received daily by the Stock Status clerk. At the end of each day's business, these Tabulating copies are marked with a small check behind the quantity of each part classified as a stock item. A summation tape of all quantities is run, and the orders are sent to the Tabulating Department for punching. This form of transaction is known as "Requirements." A weekly report of requirements is returned to the Stock Status clerk arranged numerically by part numbers listing all order numbers and quantities.

Each morning the Production Copy No. 2 of all K-orders passing through Order Assembly is delivered the Stock Status clerk by Crib No. 9. These orders are marked in a manner similar to "Requirements" except that a red "check" is used and, unlike requirements, all screws are also check marked. A summation tape is run, and the orders are sent to the Tabulating Department for punching. This transaction is known as "Shipments." A weekly report of all shipments is returned to the Stock Status clerk listing all transactions arranged numerically by part number with order numbers and quantities. Screws listed on this report are delivered to the Small Parts clerk for posting.

Disposition of Material reports (D.M.'s) are handled by the Production Control clerks. Various types of D.M.'s encountered and the copy used for Stock Status transactions are enumerated below:

- (1) DM—Material in process—Rework—pink to relieve "on order" and place in stock.
- (2) DM—Material in process—Scrap—Order Assembly copy to relieve "on order" and "available."
- (3) DM—Material in stock. Scrap—Order Assembly copy to relieve "Inventory Balance" and "available."
- (4) DM—Material in stock—Rework—Order Assembly copy to relieve "Inventory Balance," and put on order; pink copy to report into stock.
- (5) Miscellaneous DM—Material in Process—Rework—handled exactly as above.

Return Material report (R.M.'s) are handled by the Production Control clerks. All types, as listed below, affect Stock Status.

- (1) RM—Customer—this year.
- (2) Shop—order cancellation.
- (3) RM—Shop—unknown surplus.
- (4) RM—Customer—last year. If it cannot be traced to present year operations, only inventory balance and available quantities are affected.

Inventory Verifications (I.V.'s) information is sent to Tabulating on the Stock Status Adjustment Sheet by the Production Control clerks. The Door Part Requirement Book is maintained from week to week by the "Specials" clerk. Parts included are:

1. All parts on special door order bills of

material except purchased parts.

2. Showcase door parts.

3. Basic door rails from stock door program.

4. Door part extrusions sold as ship loose items. This book is turned in to the Standard Line Production Control clerk weekly to be totaled, converted to footage or pieces as is required by Stock Status listings, coded, and sent to Tabulating for punching.

A Special Door Sheet is maintained by the Stock Status clerk monthly. All lugs, clips, and shims shipped on special door orders as accumulated on this sheet are sent to Tabulating on the Stock Status adjustment form. Like parts used on stock doors are included in these accumulations. Basically, the function of the Special Door Sheet is to serve in lieu of requisitions.

As Production Orders are released for fabrication, necessary part numbers and quantities are sent to Tabulating on the Stock Status adjustment form. Upon completion, the final route sheet is sent to Tabulating by the Production Control clerk, having been coded and the amount "going into stock" indicated. Intermediate route sheets recording partial quantities of the original order into stock are handled in the same manner. Any discrepancies in quantities ordered and completed are adjusted on the Stock Status adjustment form.

Cut rack reports are handled daily by the Stock Status clerk. The number of stock lengths (or feet), as the particular part is carried on Stock Status, used to fill less-than-stock length customer orders are indicated and coded before sending to Tabulating for punching. Change notices canceling, adding to, or deleting parts of orders are processed weekly by the Stock Status clerk. The necessary resulting adjustments are included on the Stock Status adjustment form. Requisitions are reviewed, corrected, and coded daily by the Production Control clerks and the Stock Status clerk before being sent to Tabulating. The designation of right and left hand parts are coded as follows:

Right hand—01

Left hand—02

This code appears immediately after the part number, material and finish.

Parts carried in feet rather than stock lengths are so designated by a two (2) immediately following the parts word description. Parts carried in more than one length (i.e. 10' and 20') have exact length (10') designated immediately after part number, material and finish. Stock length (20') will not have such a designation. Cap degrees appear immediately before the part description. Additions and deletions of parts are initiated by the Production Control clerks by means of A. V. O.'s.

To insure the best service from the Tabulating Department on return of the Stock Status report, the following deadlines are necessary:

Shipments—by 10:00 a.m. each morning.

Requirements—by 4:30 p.m. each afternoon except cut-off days when they shall be sent at 2:30 p.m. and 4:30 p.m.

Door Part Requirements—by 4:00 p.m. on cut-off days.

*Routings, D.M.'s,
Requisitions, Stock*

Status Adjustment forms, etc., should be sent up as regularly day by day as possible and not allowed to accumulate. On cut-off days, every effort must be made to send all this information to Tabulating no later than 4:00 or 4:30 p.m.

The Stock Status report is prepared by the Tabulating Department, in general, once each week. The Production Control Department breaks off the flow of information by 4:30 p.m. Friday afternoons of each week except on month-end reports. In order to include all business of the previous month, break-off of information occurs at 4:30 p.m. the afternoon of the first working day of the following month. The only exception is "Requirements" which include one day's business of the new month. This exception, however, is felt to be unimportant.

Two forms of each Stock Status are received by the Production Control Department. Three copies each of K-47 and Standard Lines of total balances forward reports are distributed one copy each to the Production Control Clerk, the Sales Department and Staff Assistant Production Control Manager.

One copy each of the Standard and K-47 Lines tabulated report showing all transactions and balances forward are retained by the Inventory Verification clerk for reference.

Carbon Extraction

Continued from Page 111

come really essential when it is desired to have two or more sections in a set of forms. A typical example is a 6 part invoice set, 9 $\frac{7}{8}$ " x 8 $\frac{1}{2}$ " with parts as follows:

- Part 1 Customer's Invoice
- Part 2 Consignor's Copy and Transit Receipt
- Part 3 Office Copy—Numerical
- Part 4 Office Copy—Alphabetical
- Part 5 Auditor's Copy
- Part 6 Sales Department

The system requires that parts 1 and 2 be held together after printing and that parts 3 through 6 also be held together. At the same time, simple manual carbon extraction is desired. The solution is as follows:

(1) All paper parts have a $\frac{1}{2}$ " marginal perforation at the right and have 2 staples in this right margin.

(2) Paper parts 1 and 2 have a $\frac{1}{2}$ " marginal perforation in the left margin. No other paper parts have left marginal perforations.

(3) The first sheets of carbon, between parts 1 and 2, is $\frac{1}{2}$ " narrow at the right and is marginally punched on the left side only.

(4) Two staples are placed in this left margin through paper parts 1 and 2 and the first carbon.

(5) All other carbons are $\frac{1}{2}$ " short *at the left* and are marginally punched on the right side

only.

The complete set appears as in Fig. 5.

After passing through the tabulator the completed pack is separated into individual sets. Parts 1 and 2 are snapped out to the left as a complete 2 part set with the first carbon still held in position by the staples (Fig. 6). Note that the right hand marginal strips of the paper have been left attached to the balance of the set by the right hand staples. Parts 1 and 2 are ready for further posting and transit receipt signing, after which the left hand margin is snapped off, removing both the carbon and the remaining marginal strips.

The balance of the set, parts 3 through 6, appears as in Fig 7, after parts 1 and 2 have been removed, the shaded area representing the carbon paper. As there is no carbon paper over the left hand margin of paper, it is a simple matter to snap off the right hand margin carrying with it the remaining sheets of carbon.

Stapling thus makes possible considerable variety and versatility in carbon extraction for special purposes. Three and four section sets, embodying side staples, corner staples, tabs and tongues are not uncommon, and, when they have been thoroughly and carefully worked out, these systems can be used to great advantage.

Carbon Disposition

Many a supervisor has invented his own technique for disposing of carbon paper. There is the Wastebasket method: dump a small pack of 2 or 3 part forms in a clean wastebasket, pull out the paper strips only, and the carbon will remain in the basket; refold the strips of paper and separate them. Simple, isn't it? The Flip-Flop System consists of taking a pack of forms, setting them on a table, flipping the paper to one side and flopping the carbon to the other side. At the end of the pack you have a pile of carbon and a pile of paper. Patents are being applied for to cover this invention! This has to be done for each sheet of carbon, however, so it is not a method recommended for long multipart runs. Then there is Operation Floor Laying. This system entails laying a long strip of forms and carbons on the floor. Operator A holds the paper firmly at one end. Operator B grasps the carbon at the other end. By means of a quick series of militarily precise movements carbon is pulled one way and paper the other. Instantaneous extraction is achieved, and if the carbon paper is carefully refolded it can undoubtedly be used again! Some of the other methods, involving open windows, fans, atomic energy, and suicide are too complex to be treated here.

In conclusion, the problem of carbon extraction, when it exists, is no different from any other problem: it will submit to analysis. Consider the overall problem in turns of the different type of forms used, their functions, their size, and their volume. If a standardized method of extraction can be applied to all forms, so much the better. If not, then each form must be considered individually, again in relation to function, depth and width, number of parts and volume.

billing



Gilbert VanDongen

THE Florists' Telegraph Delivery Association, with its International Headquarters in the Lafayette Building in Detroit, is a non-profit corporation comprised of 9300 retail florists throughout the United States and Canada.

This Association was first organized in 1910, when a small group of 15 florists met at a Florists' Convention and discussed the idea of exchanging orders with one another. This idea proved to be very successful and by 1923, the Association's membership had grown to 2500 members.

The first over-seas application for membership was received from a florist in Scotland in 1916. Our growth in Europe was very slow until after World War I. Soon after the war, however, it became necessary to set up offices over-seas. An office was set up in London to organize the florists in the British Isles and all British possessions, and another office was set up in Zurich, Switzerland to organize the florists in all other foreign countries. Because of restrictions on dollar payments and the regulation of the export of money in many foreign countries during World War II, a parent-corporation — "INTERFLORA" was formed through which all international business is cleared. Such business could not be transacted except through an international corporation which balances accounts and settles differences on an internationally agreed basis.

In order to simplify the exchanging of orders between foreign countries, florists the world over have adopted their own medium of exchange which is termed "Fleurin." A "Fleurin" is equal to 25c in U. S. currency.

In 1923 a much needed Clearing House was established to guarantee its members payment for all domestic and foreign orders which they filled for other members. Since the establishment of a Clearing House, growth could then be measured not only by the number of members, but also by volume of business cleared. Thus, in February 1948, began a new era in the Clearing House when I.B.M. tabulating equipment was installed to handle the tremendous volume of clearings. At this point the membership had grown to 7500 members, who were sending more than four mil-

Please turn the page

about the author



Gilbert VanDongen, Clearing House Manager of Florists' Telegraph Delivery Association, became affiliated with the F.T.D.A. Headquarters Staff in 1947. He has been actively engaged in punched card machine accounting for the past 18 years. He possesses a wide experience in numerous phases of machine accounting and punched-card methods.

He is a member of the Machine Accountants Society, Detroit Chapter of the National Machine Accountants Association, National Office Management Association and American Management Association.

CODE NO.	AMOUNT	MO.	YR.	MO.	DAY
		STATEMENT		DUE DATE	

IMPORTANT—THAT YOU RETURN THIS CARD WITH YOUR PAYMENT FOR THE BALANCE SHOWN ABOVE.

FLORISTS' TELEGRAPH DELIVERY ASS'N.
200 LAFAYETTE BLDG.
DETROIT 26, MICH.

BY ATTACHING THIS CARD TO YOUR PAYMENT YOU WILL BE ASSURED OF RECEIVING PROPER CREDIT ON YOUR NEXT STATEMENT.

FORM 152



Your Code No. _____ Name _____ City _____ State _____
Date of This Report _____ Report No. _____ **TOTAL THIS PAGE \$**

List below all Orders Filled for Sending Members

NAME OF SENDING MEMBER	CITY	STATE	ITEM NO.	CODE NO.	DELIVERY DATE	RECIPIENT OR CREDIT CARD NO.	GROSS AMOUNT
			1				
			2				



INCOMING REPORT No. B 34997

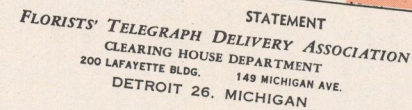
REPORT OF INCOMING ORDERS

WEEK ENDING

THESE ORDERS WILL
BE CREDITED ON YOUR

STATEMENT

CODE NO.

[illegible]

MO. YF

2

RETURN THIS PART WITH REMITTANCE

1. OPENING BALANCE
2. CASH REC'D CREDIT

3. MISCELLANEOUS

4. 20% OUTGOING DISCOUNT

5. OUTGOING ORDERS
6. INCOMING

7. 20% INCOMING DISCOUNT
8. ADJUSTMENTS

[illegible]

FLORISTS' TELEGRAPH DELIVERY ASSOCIATION
CLEARING HOUSE DEPARTMENT

REPORT OF OUTGOING ORDERS

CODE NO. WEEK ENDING

↑
CHARGES ON THIS
REPORT WILL
APPEAR ON
ABOVE STATEMENT

OUTGOING REPORT NO. I 75031

[illegible]

THIS IS YOUR ACKNOWLEDGMENT OF DELIVERY

[illegible]

lion FLOWERS-BY-WIRE orders per year for a total volume amounting to \$29,000,000.

The punched card procedure adopted by the Clearing House included the assignment of a numeric code number for each member and his state. The member who receives and fills an order is required to report this order to the Clearing House on a report form. This form lists the sending member's code number, name, date of delivery, the recipient's name, and the amount of the order. Once each week the member is required to submit a "Report of Orders Filled." A card is key punched for every order, and these cards contain the above reported information along with the reporting member's code number. These cards are also key verified. The Clearing House prepares a weekly report for each member, known as "Report of Incoming Orders." This is a listing noting each order being cleared and credited to his account. A similar report, entitled "Report of Outgoing Orders" is also prepared noting each order being charged to his account.

Summary cards containing the code information, date, total amount, and number of orders are punched. These weekly totals are then brought forward to the following week's report. Summary cards for the final weekly reports for the month become the monthly charges and/or credits to be entered on each member's monthly statement.

In addition to this, cards are punched for all cash received on the member's remittance advices. These are posted to the Members' statements as credits. Any errors resulting from the use of incorrect code numbers, incorrect amounts, duplicate charges, etc., are corrected by "Adjustments"—journal entries. Cards are also key punched for these journal entries to be posted to the members' statements.

When all entries for the month have been completed and balanced, a "pre-statement trial balance" is run listing these entries by member code number, and each member's balance is determined at this time. Summary cards for these balances are also punched at this time. Approximately fifty per cent of these accounts result in credit balances. The credit balances are separated from the debit balances and header cards are then merged with the credit balance summaries from which continuous form checks are issued. The debit balance summary cards are reproduced into "remittance cards" which are interpreted to show the member's code number, amount due and due date.

The credit balance summary cards are also reproduced as debit entries to be posted to the statements. This causes these statements to result in a "no balance" condition.

Monthly statements are then prepared and the proper remittance card or check is enclosed with each statement when mailed.

The entire "Headquarters" operations, including the national advertising program, the Members' Service Department, and the Clearing House Department are financed by the members. This is accomplished by assessing each member a

percentage of the volume cleared each month. These assessments are considered advances to cover the expenses of the Association and are placed in a reserve account for each member. At the close of each fiscal year the actual expenses are then charged to each member's reserve account on a pro-rata basis. Any balances remaining in these reserve accounts to the credit of the members are held by the Association subject to refunds as authorized by the Board of Directors.

An interesting factor not covered in the description of this operation is the fact that no carbon copies are prepared for any statements or reports. In lieu of carbon copies, the statements and reports are processed through microfilm equipment and microfilmed. It has been proven that it is far more economical to microfilm these copies, conserving floor space and the added expense of two-part forms. This reasoning may seem debatable, but in our scope of operations has proven more economical.

After the reports and statements have been microfilmed, they are processed through a bursting machine and then to a folding machine where they are automatically folded and are ready to be stuffed into window envelopes.

Since mechanization, the Clearing House has experienced tremendous gains in efficiency, speed and accuracy in the handling of its constantly increasing volume of business. During 1951 its membership had grown to 9,200 members who exchanged more than 5 million orders amounting to more than \$35,000,000.

During this same period, the overseas membership had grown to 8,500 members and the international business amounted to 75,000 orders amounting to almost 2 million "fleurins" or \$500,000.00.

The British office in London also became mechanized last year when Powers-Samas punched card equipment was installed.

Source Records

Continued from Page 124

analyzed because his experience has shown him that this is a fertile area for "cost reduction" through elimination of repetition.

Paperwork Simplification *must* occur in these four areas:

- (1) The *design of the form*—wherein the designer locates entries and typed matter, and rules so that the form can be copied, written and distributed in the fastest manner at the lowest possible cost.
- (2) The *procedure*—wherein the right information gets to the right people at the right time to justify the record.
- (3) The *type of form*—wherein paper and carbon handling time is reduced to an absolute minimum at lowest possible unit writing cost.
- (4) The *work place*—wherein the job to be performed can be accomplished with least amount of time, movement, eye-

strain and fatigue.

Once constructive simplification work is accomplished in these four phases of clerical operations, then only can we expect the machine accounting function to operate efficiently.

Paperwork Simplification Results

To jolt people into action on a Paperwork Simplification program I like to use some actual examples of results which have been accomplished with this approach:

(1) If key punch operator must punch the card from an invoice, and the invoice form is a loose paper and carbon "cut-form" which causes operator to spend 30% to 50% of her time in just getting ready to write and then after writing, separating the papers from the carbons, it is possible to just change the type of form to a one time carbon type and *double* that operator's writing production. Sounds weird, doesn't it? Not only is the operator able to write more forms in less time, but the writing cost is reduced from \$40 to \$80 per thousand forms. Is that savings dramatic enough? On top of that, copies of that invoice can travel to Machine Accounting Department sooner and cards can be punched sooner and reports can be ground out quicker. Management is informed sooner and reports are more current! Isn't this the motive in having the report in the first place? Without these qualities in a report, the information is sometimes worthless. This, many times, is just the simple difference between a good system of paperwork and a mediocre or poor one.

(Follow above paragraph with illustration "A", P. S. computer)

(2) If a machine accounting department is dependent upon receiving a copy of a typewritten invoice as its "Source Record" for key punching a card, let's see what would happen in this series of preliminary operations if several of the forms, such as Production Order, Label, Packing Slip, Bill of Lading and Invoice were *combined* into one set for one writing instead of repeated copyings? By redesign of forms one is able to *combine* any two or more forms that contain the same basic information; thus, since all these forms do contain common entries, one could not only reduce writing costs from approximately \$350 to \$100 per thousand transactions, but also provide all forms simultaneously so that Machine Accounting would get the "source" document quicker and with less chance for copying errors.

(Follow above paragraph with illustration "B")

(3) If a punched card must be *handwritten* at the action point and several departments must handle this single card, to perform their function, *before* the card can travel to the Machine Accounting Department, it is possible to create a Punched Card with several carbon copies in *one* writing in an Autographic Register, simultaneously getting numerical control, locked-in audit copies, and above all, permit the punched card to move immediately, unmutilated, directly to the Machine Accounting Department for preparation of the report.

(Follow above paragraph with illustration "C")

What? Where? When? How? Why?

One good principle to achieve Paperwork Simplifications is to *always* check the "Source" and "Subsequent" records, preceding and following any form being investigated. Once the circumstances as to how many forms are written, where and how are they written, when are they written, what is written, who gets each copy of form and why, is known, then the designer can apply the general principles of simplification by *questioning* each step!

What is done? . . . Why?

Where is it done? . . . Why?

When is it done? . . . Why?

How is it done? . . . Why?

Then, ask those who know the form best:

Can it be eliminated?

Can it be combined or changed in sequence for better operation?

Can it be simplified?

This is your guide for changing paperwork to "working papers!"

Postal money orders

Continued from page 147

the auditor. Orders paid at the post offices are forwarded to the state central accounting office. At the central accounting office all reports on paid money orders from local post offices are consolidated. The paid orders are then deposited in the local Federal Reserve Bank or branch.

A proof machine at the Federal Reserve Bank sorts money orders by regional office of issue, prepares an auxiliary tape for each regional office, and a master control tape with amounts of each money order by regional office symbol, and endorses each money order showing date and identification.

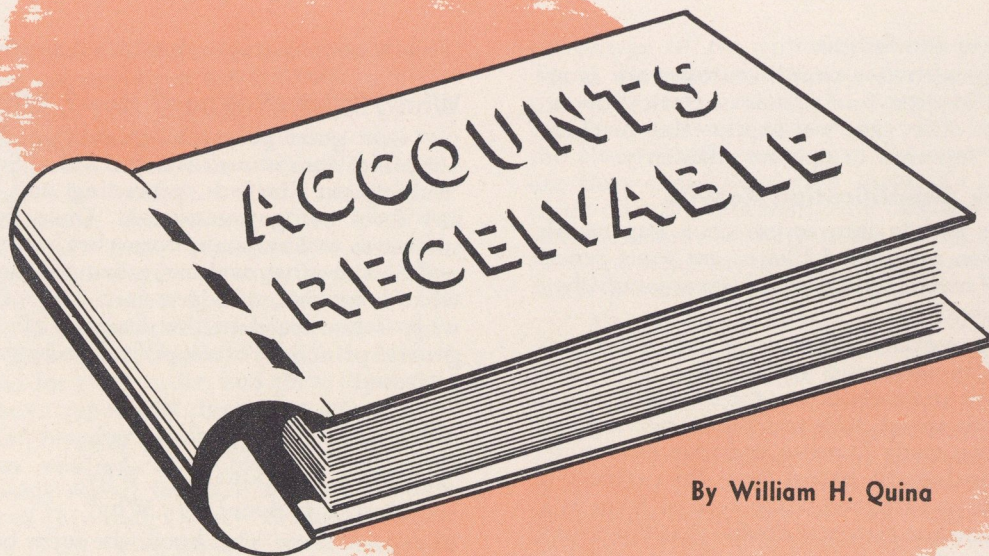
The Federal Reserve Bank then turns the paid orders over to the respective regional post offices which in turn balance the debit created by those banks and forward the money orders to the regional post offices of origin. Regional office numbers are indicated on the prepunched cards at time of manufacture.

The regional post post office of origin then mechanically sorts the money orders into serial number sequence and collates then periodically into the Paid Money Order file.

Following the close of a quarter, postmasters' statements of accountability are matched against the paid items at the regional office by means of an electronic statistical machine which totals the amounts and fees of the orders, indicates the outstanding items, and at the same time checks the file for duplicates, stolen orders, etc.

Consequently, the accountability for money-order transactions will hereafter be determined by the postal service instead of by the general accounting office.

—*"American Business"*



By William H. Quina

THE FOLLOWING is a brief outline of the procedure used by Godchaux Sugars, Inc., of New Orleans, Louisiana, to record the sales payments, adjustments and all other transactions related to the Accounts Receivable Ledger.

We are primarily engaged in the sale of refined sugar and Turbinado sugar, Syrup, Molasses and the cane by-product, Servall, to some three thousand wholesale customers.

Each customer has been assigned an identifying account number and the invoicing of these customers is done by the Tabulating Department. As each invoice is written a summary or Account Receivable Debit card with the Account Number, Invoice Number, Date and Amount is summary punched. Credits reflecting adjustments, cancellations, etc., are likewise punched.

The balance forward file is the accounts with outstanding balances as of the last period ending. They are kept in the permanent ledger file and are collated into the debit file by account and invoice numbers.

The credit file is key punched from the Cashiers Collection register and sorted to Invoice and Account numbers. This file is then collated into the combined Balance Forward and Debit file, selecting unmatched credit cards which represent misapplications of receipts to either account number or invoice number. These exceptions are referred to the Collection Department for reapplication *before* the ledger is listed.

Customer name and address master cards are collated into the accounts receivable file and this

completed file is ready to be listed on the continuous "Accounts Receivable Ledger Sheets." The Customer's Account Number, Name and Address, Date of the transaction, Reference and the Amount of Debits and Credits are listed. A minor total by invoice and the net differences, if any, are total printed. An intermediate control by account number is used to print the net balance of each Account.

As these ledger sheets are printed, a zero balance summary card is cut on a minor control by invoice number. The account number, invoice number, and amount (zero's to check) are cut in the summary cards. These cards are used to extract all liquidated invoices by account by a simple matching operation on the Collator. The remainder of the file becomes the "Balance Forward File" and after balances have been reconciled to the General Ledger, is retired until the next closing period.

The greatest advantages of the accounts receivable procedure as outlined above are: (1) By matching the receipts with the outstanding balances by Account Number and Invoice Number, any misapplication is noted and corrected *before* the ledger is run; and (2) The zero balance summary card provides an accurate and easy mechanical method of extracting the liquidated invoices from file.

(A type 403 Accounting Machine, a 514 Reproducing Punch and a 077 Collator are used in the foregoing procedure.)

ACCOUNTS RECEIVABLE LEDGER

04

ACCOUNT NO.	MO.	DATE	TR.	REFERENCE	FOLIO	INVOICE NO.	DEBIT	CREDIT	MEMO	DIFFERENCE	BALANCE
		22952	CN	2450	7288			857650	2891		
		22152	IN		7841	657377			657377		
		113051	CL	1149	8092			2462	2462		
		22052	IN		8213	843067			843067		
		22152	IN		8326	775767			775767		
		22252	IN		8327	909768			909768		
		22952	IN		8708	826799			826799		
											4156035 *
45120		PONTCHARTRAIN	CO						MINOR		
		ST LOUIS MO							Program		
			IN		5586	175187			Summary		
		20452	CN	2356	5556			175187	Punch		
		12352	IN		5587	53595			Counter		
		20452	CN	2356	5587			53595			
		12352	IN		5588	120475					
		20452	CN	2356	5588						
		12352	IN		5589						
		20452	CN	2356	5589						
					62						

These positive balances are not Summary Punched

Intermediate Program

MINOR

Program

Summary

Punch

Counter

These zero balances Summary Punched

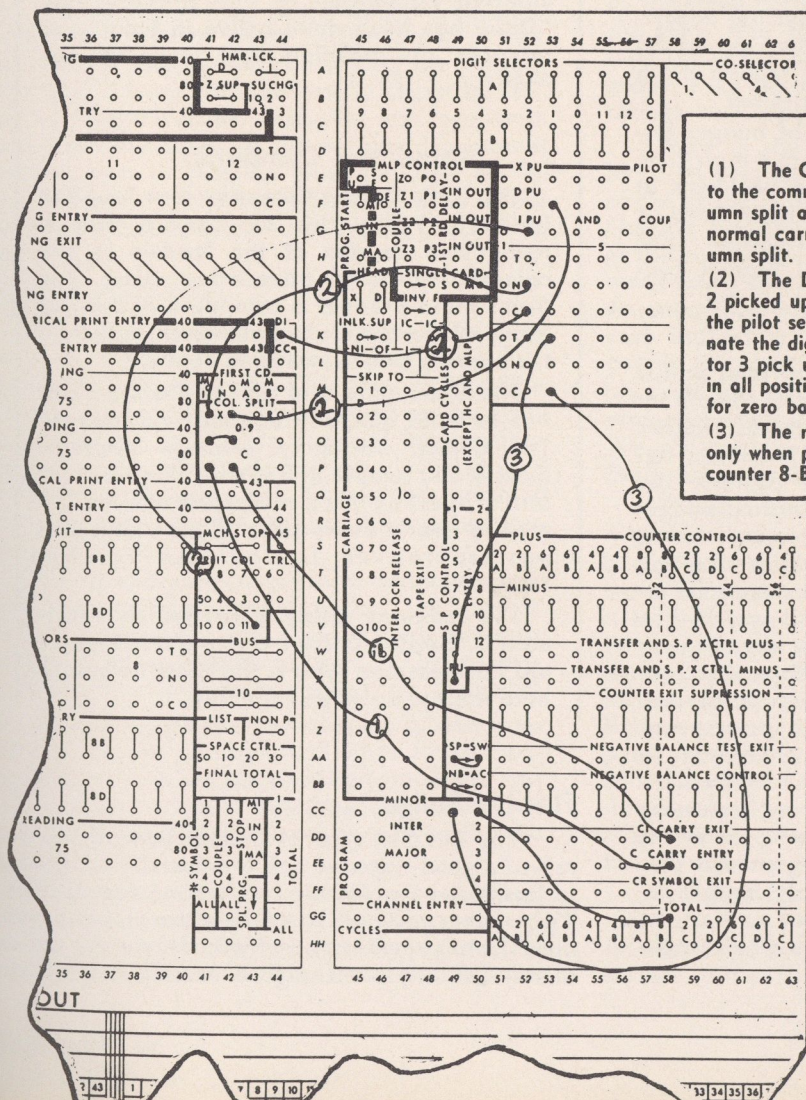
Wiring for Zero Balance Summary Punching

- (1) The CI is wired to the Common of one column split and the C to the common of another column split. The 0-9 hubs of each column split are connected with a wire. This wiring will take care of normal carryback through the 0-9 of the common hubs of the column split.
- (2) The DI hub is wired through the normal side of pilot selector 2 picked up by a split column control 11 to eliminate a 12. From the pilot selector the DI is wired to X-R of a column split to eliminate the digits 9 through 0. The resulting X will reach pilot selector 3 pick up through the CI and C of 8-B only if 9's are standing in all positions of the counter. Thus pilot selector 3 is transferred for zero balances.
- (3) The minor program exit reaches the summary punch pick up only when pilot selector 3 is transferred or whenever the balance in counter 8-B is zero.

... about the author

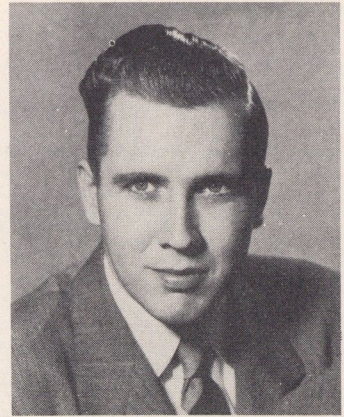
William H. Quina is a resident of New Orleans, Louisiana, and a graduate of Jesuit High School there. He completed an Accounting Course with the International University of Commerce, Chicago, Illinois, and I.B.M. Supervisors School at Endicott, New York.

He has been associated with International Business Machines equipment since 1934 as operator, Assistant Supervisor and for the past twelve years as Tabulating Department Supervisor.



A Punched Card System of Budget Control

By Richard L. Irwin



IN THIS DAY of high costs, scarce material, and higher and higher taxes, it is becoming increasingly more important for management to "watch the pennies." Because of these things, budget control systems utilizing punched cards are fast becoming one of the most important, high priority jobs in many tabulating installations. Until recent years, many companies operated by rules-of-thumb or guess-estimating procedures. But now the pendulum has swung the other way and management is desirous of fact, comprehensive reports, of pin-point accuracy, covering both the income and expenses of the business.

For the most part budget control systems have originally been developed to give business management information only to top management. However, many progressive firms, such as the U. O. Colson Company, have been quick to see that the same information passed down to supervisory levels does much more toward actually controlling the budget. As with other reports and statistics furnished by tabulating departments, it is only by constant, intense use and development of new uses that budget reports attain the full beneficial effect which is desired.

Basically, there are two types of budget systems, but of these two types there are a multitude of branches, all developed to solve problems in individual businesses with accounting systems or procedures peculiar to those businesses. The two basic types are namely, fixed budget control and flexible budget control.

Fixed Budget Control

The fixed type is based on the plan which gives each department a set budget amount at the beginning of the year, which amount neither rises or falls in proportion to some particular figure. Usually the department may disburse the budget amount as it sees fit. This annual budget figure works fine for reports, of course, unless budget reports for individual months are desired. In this case monthly budget figures must be established. This may be done several ways. The most simple is to equally divide the amount over twelve months. Another, and perhaps the most successful way, is to base the division on percentages developed from experience in prior years. This method is being used very successfully by the U. O. Colson Company. In the calendar business we have high material costs at the beginning of the year, and above average labor costs at the end of the year. So, if previous experience percentages were not used, the monthly budget reports would give an unfair picture of some of the particular departments at various times throughout the year.

... About the Author:

Richard L. "Dick" Irwin has been Tabulating Department Manager at the U. O. Colson Company since 1949, at which time he was employed to install and operate the department.

A Navy veteran of over three years, "Dick" studied accounting at Lockyear's Business College, Evansville, Indiana, and was employed as a Junior Accountant with a C. P. A. firm before joining the U. O. Colson Company.

As President of the Wabash Valley Chapter of the National Machine Accountants Association, and member of the National Steering Committee of that organization, "Dick" has been quite active in helping to advance the position and scope of the N.M.A.A.

... About the Company:

The U. O. Colson Company was founded in 1893. Today this 59-year-old firm is recognized as one of the leaders in the calendar-specialty advertising field. The firm's main product is calendars and it has many of the top flight commercial artists in the country under exclusive contract.

The home office and manufacturing plant has 14 sales offices throughout the country. The Colson Company employs approximately 500 people in its Paris, Illinois plant and in addition has a sales force of over 250 men in nearly every state of the union plus representatives in fourteen foreign countries.

The company today is headed by President U. Gordon Colson, a dynamic 31-year-old businessman who is the third Colson to hold the presidency of the firm.

Flexible Budget Control

The flexible type of budget control has received a good response and is especially adaptable to businesses employing cost accounting systems. This system is again based on percentages developed from previous experience. However, under this system the percentage is usually that of ex-

penses to direct labor. These percentages are then applied monthly to the actual direct labor and the budget amounts for the expenses are obtained. Thus the budget figures are flexible, the expense budget rising or falling in direct proportion to direct labor expense. This same system could be applied using the percentages developed by taking expenses to sales or income dollars.

Tabulating Cards Established

The budget control system as developed and in operation at the U. O. Colson Company utilizes the fixed type of control and begins each year with the creation of budget figures by the Controller. These items are then punched into cards. This information includes the alphabetic description of the account in columns 1-19, departmental code in columns 20-21, a sub-departmental code in columns 22-23, a single digit code in column 24 designating income or expense, a major heading or classification code in columns 25-26, and a minor heading or classification code in columns 27-28. The budget figure (dollars only) is punched in columns 29-35. In addition, a single digit code in column 40 is used to make a further breakdown of some of the sub-departments. Although the use of ten digits for code numbers may seem excessive, it does provide the flexibility to run many regular and special budget reports the Tabulating Department is requested to prepare.

Upon the completion of the punching, the cards are sorted and by controlling on columns 24-28, a consolidated yearly budget report is run. And then by sorting and controlling on columns 20-23 and column 40, the yearly departmental, and sub-departmental budgets are prepared. These are distributed to the various department heads as soon as possible after the first of the year, to serve as guides in planning sales efforts and departmental expenditures during the coming year.

Budget Report Data

After the yearly budget reports have been compiled, the figures are then broken down into monthly budget amounts. This is done by using previous experience percentages. The monthly figures thus arrived at are punched into another card, using the same code and amount field used on the yearly budget card. These cards are held to be used in preparing the monthly application-to-budget report.

The monthly application-to-budget report shows the monthly budget figure, the current month income or expense, and the debit or credit balance of each budget account. The current month income or expense figures are compiled from detail cards punched during the month from vouchers, payroll records, and other journal entries. These cards are accumulated until the end of the month when a summary card is created which is combined with the other cards to run the report.

To carry the budget control even further, the current month summary card is combined with previous summary cards, and a year-to-date application-to-budget report is run, using the

yearly budget cards in place of the monthly ones. It would be possible, of course, to combine these two reports into one, but because specialized needs of various departments, the reports are kept separate. However, in every case the reports are run by department, sub-department, and a consolidated budget report.

If it is desired, after each application-to-budget report, a clerk using a calculator can manually compute the percentages of expenses and incomes to budget.

At the close of each month conferences are held among the various department managers and with the officers of the company. The budgets are reviewed, and appropriate corrective or adjustive action is taken. At the end of each quarter, the budget is perused even more closely than at the end of each month. At this time thought is given to revising the budget for the balance of the year in view of necessarily increased expenditures, or by virtue of increased income. Of course, if revisions are made, the punched cards must be changed in order to reflect those changed on the various reports.

Teamwork Behind Plan

It must be stated here, that even though the budget control system works wonders in helping to keep costs and expenses to a minimum, it must be honestly and honorably administered at all levels. Nothing is quite so discouraging to a manager than to be given a budget that is pared to the bone before he gets a chance to plan for the year. And then on the other hand, nothing will kill off a department, or even a company, sooner than the wanton spending of money, even though they may be working under a budget.

Here at the U. O. Colson Company a plan has been devised which helps make everyone conscious of the budget. We have established a Profit Sharing Fund, under which each worker shares at the end of the year in a percentage of the profit made that year. Therefore, not only the managers are concerned with staying within the budget, but each individual worker. This plays an immense part in the continual effort to reduce waste time, material and effort, in addition to watching for unnecessary or excessive expenditures of money. We all know that waste will reduce the size of the profit to be divided at the end of the year.

For any installation with a desire to institute a new procedure, I would highly recommend a budget control system. A Tabulating Department Manager's stock will go up 100 per cent if he will suggest such a thing to a management where it is not now being used or considered. I am firmly convinced, from experience, that the idea will be met with a very enthusiastic response. Budget control in effect gives us the same pinpoint control of income and expense as is inherent in the many forms of material inventory control developed for punched cards. Immeasurable benefits will be obtained not only by management, but in turn by the workers.

An uninformed management is no management at all, and one of the best of the many ways in which the Tabulating Departments may be of service to them is Budget Control.

THE BILL OF LADING of each shipment is forwarded to the rate clerk where it is rated and extended. The Freight Bill is typed from the information shown on the Bill of Lading. The office copy of the Freight Bill is attached to the Bill of Lading and sent to the Traffic Department for proration. It is then coded as to shipper and consignee, station charge, inter and intra state, and then forwarded to the I.B.M. Department.

Detail cards are punched from the Freight Bills and balances on the tabulating machine by crossfooting; total freight receivable plus total interline accounts receivable should equal interline accounts payable plus total revenue. The cards are then sorted by pro number and a daily manifest is listed. The cards are processed through sorter and C. O. D. shipments removed.

From these cards, a C. O. D. register is run. The remainder of the cards are sorted on the last digit of the freight receivable amount with sort suppression on. All cards sorted in the "12" pocket are reproduced on the accounts receivable form card and merged into the accounts receivable file. The rejects on the former sort should have no freight cards pulled. All detail cards are then separated between interchange and no-interchange and filed into respective files.

At the end of each ten-day period the cards with interchange are sorted on pro number and connecting line. The interline statements are listed and balanced with the control book. The cards are then sorted to separate intra and inter shipments. These shipments are sorted separately to get received and forwarded cards. All four groups are sorted separately on connecting line. The cards are forwarded to the tabulator and summaries cut for use in the connecting line report at the end of the month.

The interchange cards on the former operation and the cards in the no-interchange file are sorted together on station-to- and station-from. These are separated between intra and inter shipments. The report is run only for the purpose of getting summary cards that are to be used in the tonnage and revenue report at the end of the month.

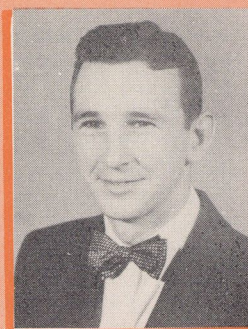
At the end of the month the connecting line summary cards are used to determine the amount we paid each connecting line in comparison with the amount each connecting line paid us. Master cards are used to intersperse the connecting line code. The tonnage and revenue summaries are used to determine the outbound shipments from each terminal and the inbound shipments to each terminal. A report is also run showing the analysis of shipments from each terminal to all other terminals. Master cards are used to intersperse gangpunch the terminal point to point codes in order to run a report showing shipments from point to point.

The totals of weight and revenue on all the above end-of-the-month reports are balanced to the control book that originated from the totals of each daily manifest.

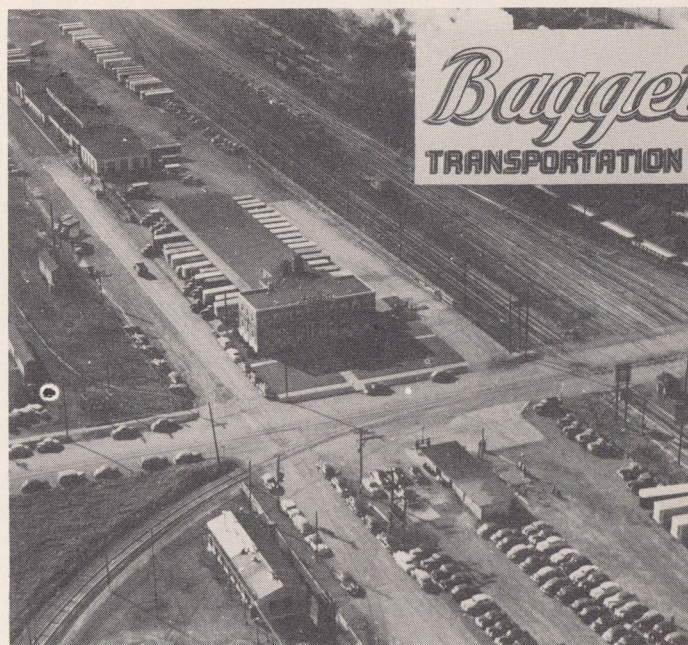
REVENUE and STATISTICS

By Albert W. Fisher

... about
the
author



In 1948, while attending business college, our author, Albert W. Fisher, was also training in the local I.B.M. Service Bureau after school hours. In February, 1949, he began working with the Ingalls Iron Works Company as a machine operator. After working there two years, he went with the Standard Oil Company as supervisor of that installation. A year later he left to join his present employer, Baggett Transportation Company, Inc., who are one of the leading transportation companies serving Alabama through fifteen transportation terminals.



the Punched Card

Utility Billing

Continued from page 101

racy of meter reading subtractions. The total of the folio numbers is also agreed with a folio control sheet in the front of each meter book. The checking machine rapidly takes a meter count and at the same time ejects cards when meter reading subtractions are incorrect. Billing cards carrying constant data are also ejected during this operation to be checked. Cards in error are corrected and restored to the pack of cards for the particular meter book. All of this work is performed in one run of the billing cards.

Billing cards into which the keypunch operators did not punch the regular reading date, are run through the sorter to verify that no punches appear in the present meter reading date columns. From the sorter, the billing cards are taken to the gang-punch where the present meter reading date is gang-punched from a master card. When the billing cards are used for the second period's billing, the due date is also punched for the new period, except for those cards which have been punched with special due dates.

Billing cards in large groups are sorted automatically at high speed by rates, billing codes (to separate the regular from irregular bills), and steps of use. Master rate cards are mechanically interspersed with all regular billing cards. The billing cards to which master rate cards can be applied are extended automatically by gang-punching the gross and net amounts of the bill for the block of kilowatt hours used.

The billing cards together with the master rate cards are again separated by sorting and the master cards are returned to their file to await the next group of billing cards. After this operation, the billing cards are in district route and folio order. The billing cards are tabulated on the accounting machine to prepare a route control sheet. This control is run by individual routes for each district's accounts being billed and shows the number of customers, total use, and revenue.

After the route controls are run, all billing cards and name and address cards are placed in the collator to determine that there is a billing card for each name and address card and that both cards are in proper sequence. This assures that the information on both sides of the bill will be for the same customer.

Continuous Operation

The billing cards and name and address cards are now ready to complete the printing of the bill. In this operation, the amounts billed are accumulated in the accounting machine and verified to the amounts previously entered on the route control sheet. The continuous form bills are processed through the accounting machine to print the customer's name and address on the other side of the form, from the name and address cards which were previously automatically sequenced with the billing cards.

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tabulating machine
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Our 14 years of experience enables us to provide you with Lithostrip forms of guaranteed accuracy and workability. We have supplied forms for the 407 tabulator without the recommended 1/10 inch tolerance between columns. We also manufacture fanfold type, thread-sewn, marginally-punched forms for volume invoicing.

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Tips on Tabulating

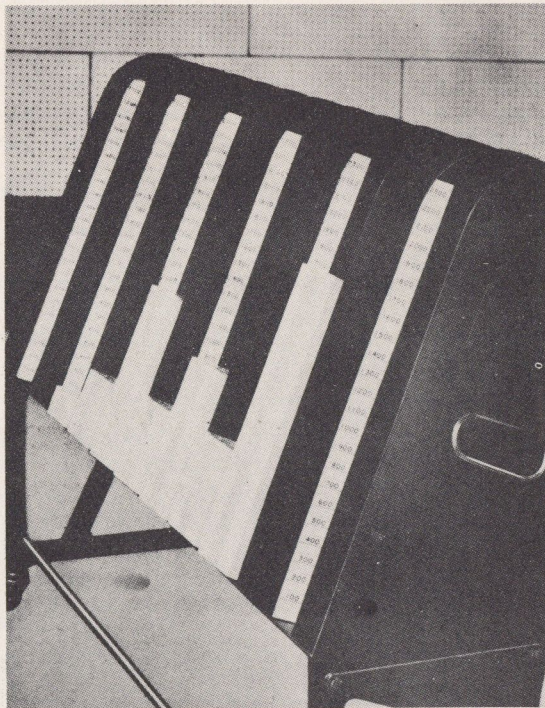
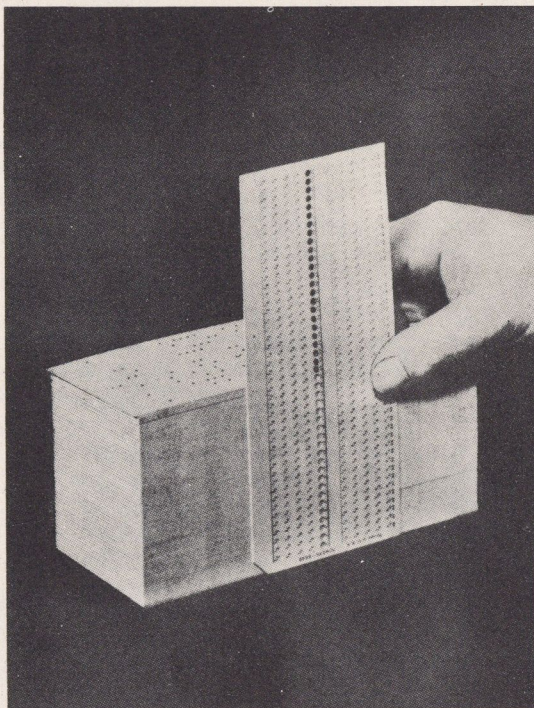
Three Suggestions for Quick Calculations of Card Quantities

1. On the sorter rack, a scale has been fitted on the alternate partitions of every compartment. The scale is calibrated to 100 cards per step. (100 cards— $\frac{2}{3}$ inch) Accordingly, it is a simple matter to estimate the approximate number of cards within a rack and, consequently, anticipate the time required to sort that number. The scale is drawn on paper strips which are folded and glued along the front edge of the partitions so that the graduations of the scale show on each side. This method eliminates the need of affixing a scale to

every partition.

2. The card columns of any tabulating card provide a convenient means of estimating approximate total quantities of cards in small stacks. The numbered card columns are used as a scale along with the following formula: Card column $\times 22$ plus 12 equals the number of cards in the stack.

3. Measuring stacks of cards in standard inches will also yield a close approximation of the number of cards. The formula for this purpose is: 1 inch equals 150 cards.



A Simple Spot Punch Method of Transferring Controlling Information from Original Job Card to Trailer Job Cards (90-Column)

IN MANY PLANTS most of the workers are assigned only one job per day. Under this condition Remington Rand's Spot Punch furnishes an ideal way to record labor distribution information and elapsed time when the job is done. If, therefore, a pre-punched card is reproduced daily with fixed information such as Employee Name and Number, Shift, Rate Code and Department, a completely punched card can be created on the spot—when Job Cards are distributed.

Occasionally, however, certain employees work on more than one job. It then becomes necessary to create additional Job Cards, or "Trailer Job Cards," for them.

In these cases it is necessary to transfer the fixed information—which is normally pre-punched—to the Trailer Job Cards. Spot-punching such a wide variety of information, including alphabetical punching, would not prove practicable.

With the Remington Rand Multi-Control Reproducing Punch, this transfer is made auto-

matically . . . with complete assurance that the proper Man Number information is transferred to the proper Trailer Job Card.

The Master File from which the Daily Job Cards are reproduced carries Man Number in both 90 and 45 column code. At the time the Trailer Job Card is created, the Man Number is spot-punched in the 45 column field. The source of entry is the interpretation of the 90 column pre-punched field. Spot-punching is proved by a "sight check" of the two cards.

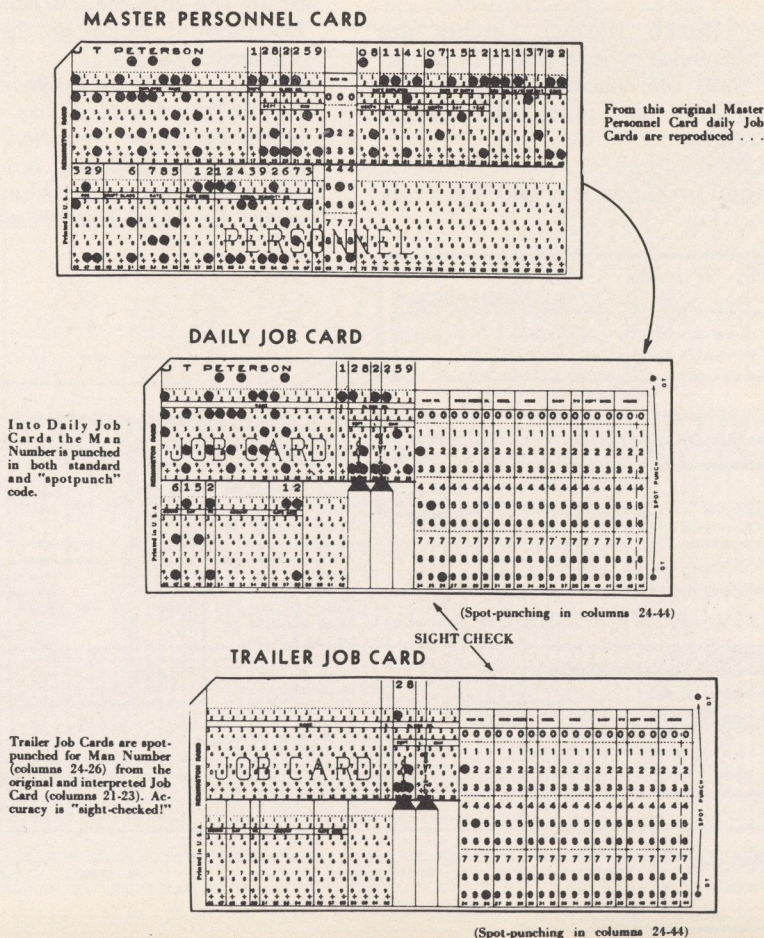
When the cards are returned to the Tabulating Department, all Trailer Job Cards are fed through the punching unit of the Multi-Control Reproducing Punch. During this run the machine will compare the spot-punched Man Number against the pre-punched Man Number of the Original Job Card. Thus, without fail, the pre-punched information from the Original Job Card will be reproduced into the proper Trailer Job Card.

Results:

The Original and Trailer Job Cards may be sorted together by Employee Number.

Any information reproduced on the Original Job Card may be transferred to all Trailer Job Cards—under complete control—by the Multi-Control Reproducing Punch.

This positive accuracy of Trailer Job Cards enables you to balance Attendance Time against Job Time by means of a Variance Report . . . instead of by the costly and time-consuming method of balancing Attendance Hours against Job Hours by man!



Method of Computing O.A.S.I., Withholding Tax and Total Tax Amount Automatically On the Tabulator and Summary Punch

THE COMPUTATION of O.A.S.I. and Withholding Tax has created quite a problem in installations where there is only a basic battery of equipment and a Summary Punch. However, the Simplex Pairing Device is the only special attachment needed in conjunction with the basic equipment in order to make automatic extensions. Exhibits 1 and 2 illustrate the typical wiring for the Tabulator and Summary Punch Wiring Units necessary to accomplish these automatic extensions. Notice the Inverted Y-wiring in the Summary Punch Wiring Unit and the "E" Block (raises automatically on total stroke only) in the so-called Clearing Unit of the Tabulator Wiring Unit. As a result, Master Tax Cards (see Exhibit 3) are created.

The Master Tax Cards are placed in the Sorter first, followed by the Earnings Cards (Exhibit 3), and are sorted together by Gross Pay and Tax Code. The cards are then placed in the Sorter upside-down with the Simplex Pairing Device made active. By sorting on the Pairing Control column, the excess Master Tax Cards—those for which there are no comparable Gross Earnings Cards—are removed. The active cards are placed in the Tabulator and the following Tabulator and Summary Punch control settings are made:

1. The Summary Punch is made operative and set to punch Summary Cards on both totals and grand totals.
2. The Summary Punch Retract Latches are locked down on the fields where O.A.S.I., Withholding Tax and Total Tax Amounts are punched.
3. The Automatic Total and Grand Total Control Levers are set as follows:
 - (a) Total on Man Number
 - (b) Grand Total on Gross Pay and Tax Code

4. Printing Units 1, 2, 3 and 4 are set to designate and Unit 5 to add.

5. The Print Control is out for a Totals only operation.

When the Master Tax Card enters the Tabulator, all of the punched information is sensed and transmitted to the head of the machine ready for punching in a summary card, on the next Total stroke. On this Total stroke, all of the designating information—Tax Code, Gross Pay, O.A.S.I., Withholding Tax and Total Tax amounts—is set in the dies of the Summary Punch and a card is punched. No action occurs, however, in the Clearing Unit because of the operation of the "E" Block which raises automatically on the Total stroke to block the release of the accumulated 1's in that unit. The O.A.S.I., Withholding Tax and Total Tax amounts are retained in the dies of the Summary Punch due to the setting of the Retract Latches and will punch in the succeeding Summary Gross Earnings Cards. (Exhibit 3.) The accumulated 1's in the Clearing Unit will be retained on the following Total strokes due to the action of the "E" block. The summary tabulation used to prepare these summary cards is shown in Exhibit 4.

On a Grand Total change of designation, the "E" block does not operate, the accumulated 1's are released from the Clearing Unit, and the dies set in the O.A.S.I., Withholding Tax and Total Tax amount fields of the Summary Punch are replaced with 0's.

The summary cards obtained at the time the Master Tax Cards set up the extensions and the summary cards obtained on the Grand Total Clearing strokes are not required and are removed automatically when all summary cards are sorted by Employee Number.

TOTAL (Master Tax Card)
TOTAL (Gross Earnings Card)
TOTAL (" " ")
TOTAL (" " ")
GRAND TOTAL
TOTAL (Master Tax Card)
TOTAL (Gross Earnings Card)
TOTAL (" " ")
TOTAL (" " ")
GRAND TOTAL
TOTAL (Master Tax Card)
TOTAL (Gross Earnings Card)
TOTAL (" " ")
TOTAL (" " ")
GRAND TOTAL

EMP NO.	TAX CODE	GROSS PAY	O.A.S.I.	WITHHOLDING TAX	TOTAL TAX AMOUNT	CLEARING UNIT
100	1	5000	50	1000	1050	
101	1	5000	50	1000	1050	
102	1	5000	50	1000	1050	
110	1	5000	50	1000	1050	11111111
GRAND TOTAL						
101	1	5500	55	1100	1155	
102	1	5500	55	1100	1155	
103	1	5500	55	1100	1155	
142	1	5500	55	1100	1155	
156	1	5500	55	1100	1155	11111111
GRAND TOTAL						
2		5000	50	1020	1070	
104	2	5000	50	1020	1070	
112	2	5000	50	1020	1070	11111111
GRAND TOTAL						

NOTE:

The shaded areas indicate the extensions set in the punching dies of the Summary Punch and repeat—punched the Summary Gross Earnings Cards.

A Simplified Method of Detecting Missing Serial Numbers

UNDER THIS METHOD, indications are printed only for those sequences which are in error. The elimination of the indication after each correct sequence is obtained by an ingenious wiring scheme, combined with the exclusive cipher cut-out feature of the tabulator.

Instead of wiring the control digits 1 to 9 to their normal stops and Y-wiring the O position to the 1 so that their total will be 46, the control digits are so wired that they will add to 100. The sector which would normally print the digit 1 of the 100 figure is, however, locked out and the cipher cut-out to the right of the sector is made operative.

Thus, in the event a sequence is complete, the 100 control figure is automatically prevented from printing.

The same method of preventing correct control totals from printing can be used with regard

to the card count as well. In this case, the sector which would print the 1 digit of the control total of 10 is also locked out and, again, the trailing zero is prevented from printing by setting of the cipher cut-out device

Thus, in the event of a complete sequence of 10 cards, no indication will be shown. In the event that a group contains less than 10 cards, the true number of cards will be shown. When there are more than 10 cards, only the last digit of the number of cards in the group will print.

The portion of the wiring unit diagram that indicates the wiring to achieve these results, is portrayed. It will be noted that in order to arrive at a sum total of 100, the digits 1 to 9 are wired normally but the 0 Position is Y-wired to the 5 stops of the two sectors which accumulate the control total. Thus, the sum total of the digits 0 to 9 will always equal 100.

SALES CHECK AUDIT				
DEPT.	CLERK	BOOK & CHECK NO.	TOTALS	
			CONTROL	C. C.
841	123	4800		
841	123	4801		
841	123	4802		
841	123	4803		
841	123	4804		
841	123	4805		
841	123	4806		
841	123	4807		
841	123	4808		
841	123	4809		
841	123	4810		
841	123	4811		
841	123	4812		
841	123	4813		
841	123	4814		
841	123	4815		
841	123	4816		
841	123	4817		
841	123	4818		
841	123	4819		
841	123	4820		
841	123	4821		
841	123	4822		
841	123	4823		
841	123	4824		
841	123	4825		
841	123	4826		
841	123	4827		
841	123	4829		
841	123	4830	92	9

↑ ↑
WHEN GROUP IS
COMPLETE, TOTALS
ARE SUPPRESSED

↑
CONTROLS SET ON
THIS FIELD

NO. 4828 MISSING

DEPT.	CLERK	BOOK & CHECK NO.	TOTALS
DESIGNATE		DESIGNATE	ADD
1-N		2-N	3-N
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32
33	34	35	36
37	38	39	40
41	42	43	44
45	46	47	48
49	50	51	52
53	54	55	56
57	58	59	60
61	62	63	64
65	66	67	68
69	70	71	72
73	74	75	76
77	78	79	80
81	82	83	84
85	86	87	88
89	90	91	92
93	94	95	96
97	98	99	100

Commercial Research
TABULATING
Machines Division

DEPT.	CLERK	BOOK & CHECK NO.	TOTALS
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32
33	34	35	36
37	38	39	40
41	42	43	44
45	46	47	48
49	50	51	52
53	54	55	56
57	58	59	60
61	62	63	64
65	66	67	68
69	70	71	72
73	74	75	76
77	78	79	80
81	82	83	84
85	86	87	88
89	90	91	92
93	94	95	96
97	98	99	100

Absentee Records on Punched Cards

THERE has been a good deal of publicity regarding the problem of Absenteeism. Many articles have been written describing the methods by which Industries are solving this vital problem. The word "Absenteeism" has become almost synonymous with "Slackerism," although this should not be so. There are many legitimate reasons why a worker cannot be at his post. It is the duty of management to determine the exact reason for all absences in order that steps may be taken to keep the plant running at full capacity. There have been many devices used to obtain this end; however, most of these are in the form of posters and appeals to the patriotism of the worker. We believe these to be good, but a more direct approach to the problem should also be used.

One of this country's leading manufacturers of defense products uses his Remington Rand Model 3 Tabulating Equipment for keeping a record of the names, and the reasons for absences, of all employees.

Each department foreman reports the employees absent in his department on the form, Daily Report of Employees Absent, (Exhibit A). This report is forwarded to the Tabulating Department, where cards are punched, showing Clock and Department Number, Name of Employee, Date, Sex, and Shift. (Exhibit B.)

A tabulation is then prepared from these cards showing the number of employees absent

by Department, Sex, Shift, and Plant. As each of the absent employees returns to work, he signs a slip which shows the Clock and Department Number, Job Class, and the reason for absence. (Exhibit C.) This slip is forwarded to the Tabulating Department, where it is matched with the card or cards that were punched from the Daily Report of Employees Absent, and the Reason Code and Job Class are punched into the card or cards.

Various tabulated reports are obtained by Department, Sex, Shift—by Reason, Sex, and Shift—by Department and Clock Number, showing the number of days absent and the number of employees absent. (Exhibit D.)

To obtain automatically an account of the days absent and the number of men absent, two card count positions, as shown on Exhibit B, are required, or one position Y-wired into two adding units of the tabulator.

The tabulated reports of absentees and the reasons for their absences provide management with the proper information by which it may plan a campaign for preventing inexcusable absences. The management's appeals can be pointed toward the individual because the full details about each employee are available. Further, the detailed information about departmental groups furnishes management with information that enables it to foster a competitive spirit between groups for better attendance.

ABSENTEE REPORT

EMPLOYEES NAME	DEPT	CLOCK	DATE YR MO DAY	2ND CLASS	SES	SHIFT	REASON	NUMBER OF DAYS ABSENT	NUMBER OF EMPLOYEES ABSENT
A GULL	8	30	11/3	45.2	3	1	1	8	1
L HUDSON	8	30	4/3	43.2	1	1	1	8	1
V KRAFT	8	30	6/3	43.7	2	1	1	4	1
M AMBERS	8	30	11/3	39.7	99.8	1	1	14	1
F LABER	8	30	19/3	43.6	1	1	1	3	1
E RICH	8	30	17/3	43.8	1	1	1	8	1
N LEWISMAN	8	30	19/3	49.0	8	1	1	7	1
E MC PHEE	8	37	29/3	49.6	1	1	1	3	1
L OLDHAM	8	37	21/3	4	1	1	1	3	1
F REILLY	8	37	4/3	43.6	1	1	1	4	1
J CHIESA	8	37	4/3	49.4	1	1	1	7	1
B HOBKINS	8	37	8/3	43.7	2	1	1	8	1
J SAVIN	8	37	29/3	39.9	2	1	1	1	1
K STICKLEY	8	37	40/3	4	1	1	1	14	1
M WEISSNER	8	37	28/3	4	7	1	1	3	1
B MARTIN	8	37	71/3	43.8	1	1	1	1	1
B CALIVAS	8	37	76/3	39.9	2	2	1	19	1
W INGLE	8	37	77/3	4	6	1	2	3	1
T STEVENS	8	37	80/3	49.5	1	2	1	2	1
M WOLFE	8	37	82/3	5	1	2	1	2	1
R EMERSON	8	37	85/3	43.1	1	2	1	4	1
W BRESNEHAN	8	37	88/3	49.2	1	2	1	6	1
E HARTMAN	8	37	90/3	39.2	8	2	1	32	1
J DIAMOND	8	37	94/3	5	1	2	1	2	1
A CRAWFORD	8	37	98/3	39.0	2	2	1	1	1
M MCCOY	8	37	99/3	43.9	2	3	1	1	1
B CORNINS	8	37	102/3	39.9	1	3	1	3	1
L BRADY	8	37	104/3	4	7	1	3	2	1
B MORSE	8	37	107/3	5	1	2	3	2	1
W TAYLOR	8	37	115/3	49.2	2	3	1	1	1
C BRUNGS	8	37	118/3	4	8	2	3	1	1
A ARMSTRONG	8	37	122/3	45.7	1	3	1	4	1
M PLASS	8	37	124/3	45.6	8	3	1	6	1
J CONNOLLY	8	37	127/3	45.3	8	3	1	4	1
J DENNIS	8	37	129/3	49.0	1	3	1	18	1
E RITT	8	37	129/3	43.1	1	3	1	10	1
B ROEDER	8	37	129/3	43.5	1	3	1	4	1
E BULLOCK	8	37	178/3	45.0	8	3	1	4	1

387

226 396

EXHIBIT

D

**EXHIBIT
D**

DAILY REPORT OF EMPLOYEES ABSENT

[illegible]

**EXHIBIT
A**

EXHIB
B

EMPLOYEES REPORT OF ABSENCE FROM WORK

DATE 4-21-63
DEPT. 9-27 CLOCK 122 JOB CLASS _____ NAME A. Gennetong
I WAS ABSENT FROM WORK FOR THE
PERIOD OF April 17 thru April 20
DUE TO THE FOLLOWING REASON acute sinus
infection (Doctor's certificate attached)

EMPLOYEE'S SIGNATURE

EXHIBIT
C

IBM

TRADE MARK

INTERNATIONAL BUSINESS MACHINES CORPORATION
COLLATOR, TYPE 77 CONTROL PANEL

FORM 22-9133-9
PRINTED IN U. S. A.

—LOW SEC
EQUAL
LOW PRIMARY
HIGH 2nd PRI
EQUAL 2nd PRI
LOW 2nd PRI
—RUNOUT
—COUNT
SOURCE IN
POPSO TO

SELECTORS
10—O P 1 0 0 0 Q 0 0 0 0
PU L C NX X
20—O G 2 0 0 0 0 0 0 0 0 0
30—O 3 0 0 0 0 0 0 0 0 0
40—O T 4 0 0 0 0 0 0 0 0 0
50—O C 5 0 0 0 0 0 0 0 0 0
CYCLE DELAY
TOTAL

SEC SELECT—
PRI SELECT
SEC FEED
PRI EJECT
PRI FEED
ERROR STOP

CONTROL
BASIC SETUP
MULT S & S
PRI CHANGE
INTERLOCK

OPERATION:
SECONDARY CARDS
PRIMARY CARDS

SEL. SECONDARIES	SEPARATE	MERGED	SEL. PRIMARIES
		Town cards and customers in each town.	Excess Towns No customers and sales there.

SECONDARY ZONE BRUSHES—15
PRIMARY ZONE BRUSHES—15
PRIMARY SEQUENCE ZONE BRUSHES—15
SECONDARY BRUSHES—15
PRIMARY BRUSHES—15
SECONDARY SELECTOR MAGNETS—2
1st PRIMARY SEQUENCE MAGNETS—2
PRIMARY SELECTOR MAGNETS
PRIMARY SEQUENCE MAGNETS—2
2nd PRIMARY SEQUENCE MAGNETS—2
PRIMARY SEQUENCE BRUSHES—15

SHS
SEL-PS
CTRL INPUTS
P-PS1-PS2
RESTORING MAGS
PX-PU SX-PU

NAME Selection of "unmatched" Town name cards from merged file of Town, Customer and Sales cards.
USE Town cards have "12" in Column 23. Feed face up, 12 edge leading; work from back of file.
First card in machine must have a "12" in column 23 to set up "19" in second primary sequence.

We frequently prepare sales analyses showing:

- Name of Town
- Name of 1st Customer
- Products bought and detail data
- Name of next Customer
- Products, etc.
- Name of Town
- Customer
- Products

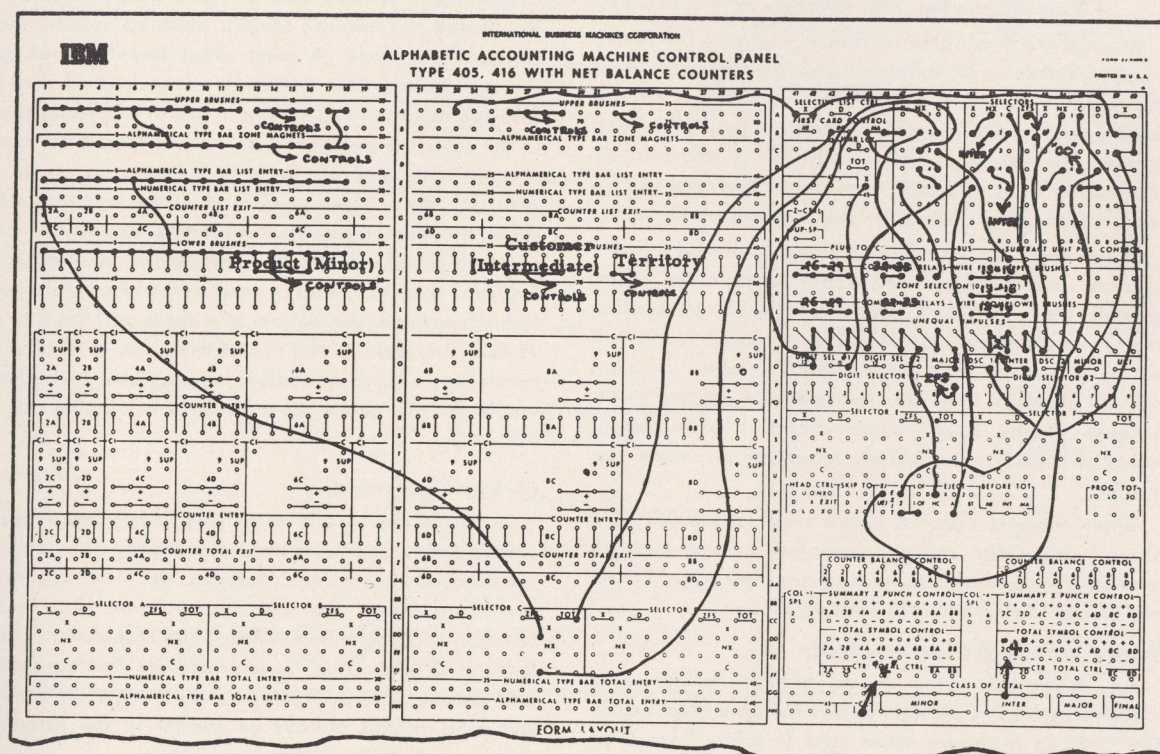
Sales cards are merged into Customer cards in the normal manner, selecting unmatched cards from both files. This eliminates names of customers who didn't buy.

Merged deck of Customers and Sales is then merged into Town name cards, which also have a "customer" number in the control field. However, these "customer" numbers in the Town name cards will never match any of the control numbers in the merged Customers and Sales group, and it is not possible to eliminate Town

names where there were no active customers in the normal manner.

All Town name cards have a special "12" punched in column 23. A special "set-up" card with a "12" in column 23 is placed in back of the merged Town, Customer and Sales cards. To pull out unwanted Town name cards using the attached collator diagram, the file is fed into the Primary feed face up, 12-edge leading, working from the back of the file to the front. (This does not reverse card columns as shown on control panel.)

No restoration is wired for the 2nd Primary side of the Sequence magnets as there is one automatic restoration just before the first card passes the Sequence brushes. This reads the punched "12" as a "9" and holds it in the 2nd Primary side. Selection is made through the Cycle Delay so only a "9" followed by a "9" selects. This allows the Town name card which belongs with the Customers and Sales in that town to go unselected into pocket 2, but will select all unwanted Towns into pocket 1 until the next group of Sales and Customer cards comes along.



The IBM 405 diagram illustrates a combination of several devices designed to improve the over-all appearance of our sales analysis reports, and at the same time speed up the tabulating. In actual practice the elimination of unnecessary control cycles, so far as is possible, cuts down to about 60% the running time it would take if wired normally.

Note that control cannot be suspended by this method if there is a 9 (or I, R or Z) in any control column, but if the customer number code is set up to avoid 9's in the units and tens position (columns 28, 29), desired control elimination can be more than 90% effective.

Report is to show names of all towns and customers, whether they bought anything or not, together with detail sales data for all sales in period analyzed.

Purpose of control elimination: In a report of this type there are always a number of customer name cards for which there are no detail sales cards. With normal wiring, tabulator would recognize Intermediate control change for each customer name card, and take three machine cycles: list, minor total, and intermediate

total. It would also "open up" printed report unnecessarily on account of spaces for these extra cycles. With control elimination, where it is desired to take advantage of it, unequal impulses after the 9 position of the card is read, are not recognized, and the selective X list prints the customer (or town) name in one cycle.

Cards used:

Town name cards (column 23 punched 12, 11 and 9)

Customer name cards (column 23 punched 11 and 9)

Detail sales cards (no 12, 11 or 9 in column 23)

Town and Customer names are punched columns 1-18.

Detail cards have other data in same columns, including product number, which is Minor control, columns 13-16. Impulses from columns 1-12 and 17, 18 in name cards are suppressed from listing by X-Hammerlock control.

Customer numbers in all cards, columns 26-29, for Intermediate control.

Territory numbers in all cards, columns 32, 33, for carriage ejection only.

Assignment of selectors:

- No. 1, 2 used for control elimination.
- No. 3 and Class Selector C, to print an asterisk if any customer name is missing.
- No. 4, 5 for selective overflow area ejection.

Operation of control elimination:

Upper brush 23 is taken to X-pickup of Selective List Control (so all town and customer names must print, even with control suspended). Impulse is then continued to pick up selectors No. 2 and 3 at their X-hubs, and from there into the common hub of Digit Selector No. 1 for selection of 9s, 11s & 12s.

When there is a name card ready to pass the lower brushes, followed by another name card about to pass the upper brushes, it is desirable to suspend control during next card feed cycle. At the time the "9" is read at the upper brushes, selector No. 1 is immediately transferred before the "8" position of the card can be read, suspending control for the balance of the cycle.

When there is a detail card about to pass the lower brushes, and a name card about to pass the upper brushes, there will always be a change in Intermediate control number, and in this instance selector No. 2 will not be picked up, and Intermediate unequal impulses will go through it to the Intermediate control hubs. Because of the Intermediate control change, Minor totals will be forced before Intermediate totals are printed.

When there is either a detail card or a name card about to pass the lower brushes, followed by a detail card about to pass the upper brushes, both Intermediate and Minor control operate normally.

Space and ejection control:

An automatic extra space without using extra machine cycles is desirable before listing a town name. The "12" in the town name card is taken from Digit Selector No. 1 into selector No. 2 and out of the transferred side of the selector to Major first card control for an extra space. If the form happens to be near the bottom of the sheet in the selective over-flow area, the "12" is also taken through selectors No. 4 and 5 to cause a Major control break, which forces an Intermediate Class of Total impulse and causes ejection of form. This eliminates possible printing of a town name

at the bottom of one sheet and the first customer name within the town at the top of the next.

If there is a detail card about to pass the lower brushes, followed by a town name card about to pass the upper brushes, the "12" is available out of the no-X hub of selector No. 2 and is taken to a comparing relay to cause a Major control change. In this instance there would always be an Intermediate control change anyway, so there is no loss of time, but it does include an extra space ahead of the town name.

Selective Overflow Area:

Arm No. 1 is set 1 inch or 1-2/6 inch ahead of Arm No. 2 and the impulse from it picks up selector No. 5 on the next cycle. A card count impulse then goes through Selector No. 4 which is not picked up, and into selector No. 5 to keep picking it up for a holding circuit. In the selective overflow area, any Intermediate control change will eject the form to the next page, as will also any town name card read at the upper brushes. When the carriage ejects, "EJ" emits an impulse which picks up selector No. 4 and cancels the holding circuit. Selective overflow area is used to avoid printing a customer's name at the bottom of a sheet and the first sale to that customer at the top of the next. In case a customer buys quite a number of products, Arm No. 2 would finally cause ejection before running off the bottom.

Other "gimmicks":

In case a customer's name card is missing, it can be recognized as a detail card immediately after an Intermediate control change. Selector No. 3 would not be picked up, and a "hot 10" from Subtract Unit Position is taken through it and through the transferred side of Selector C (picked up by Intermediate first card) to an odd numbered type bar to print an asterisk. Errors of this kind should always be caught in the tabulating department before delivery of reports.

Territory (columns 32, 33) is wired to the control unit and the unequal impulses taken into the Digit Eject hub so each territory will begin on a new sheet without the necessity of feeding small groups into the tabulator individually.

In our sales analysis work, we keep a running history of month of latest purchase in each of our customer name master cards. We assign a card column of the master to receive this data for a whole year, punching the months January—September as "1" to "9" respectively, "0" for October, "11" for November, "12" for December.

Although the "12" punch is read last as it enters the tabulator, it must take precedence over any other punching in the same column so the printed report would show "12" in the column "Month of Last Sale." If no "12" is punched, then "11" must take precedence

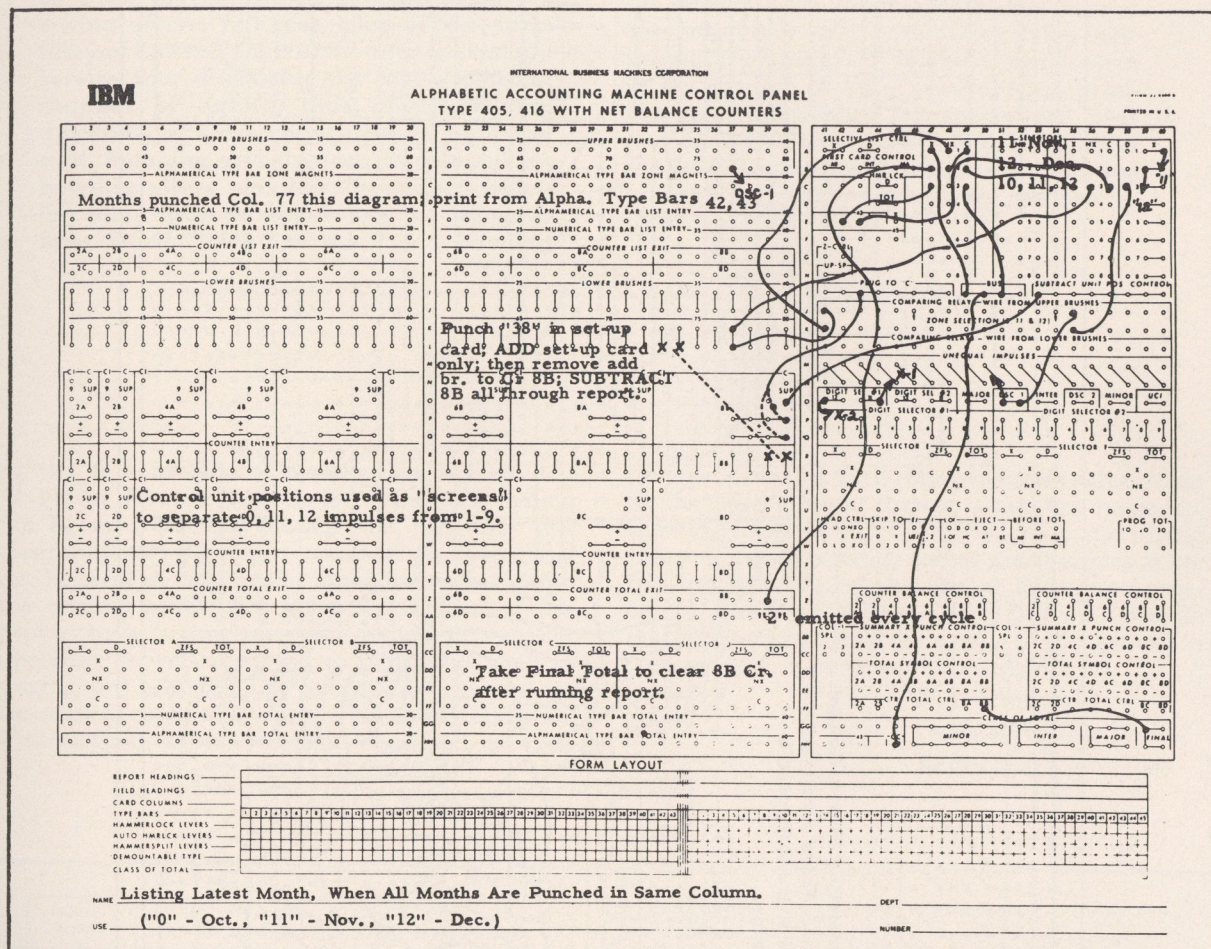
over any other punching. If no "12" or "11" is punched, "0" must take precedence over any "1" through "9" punching.

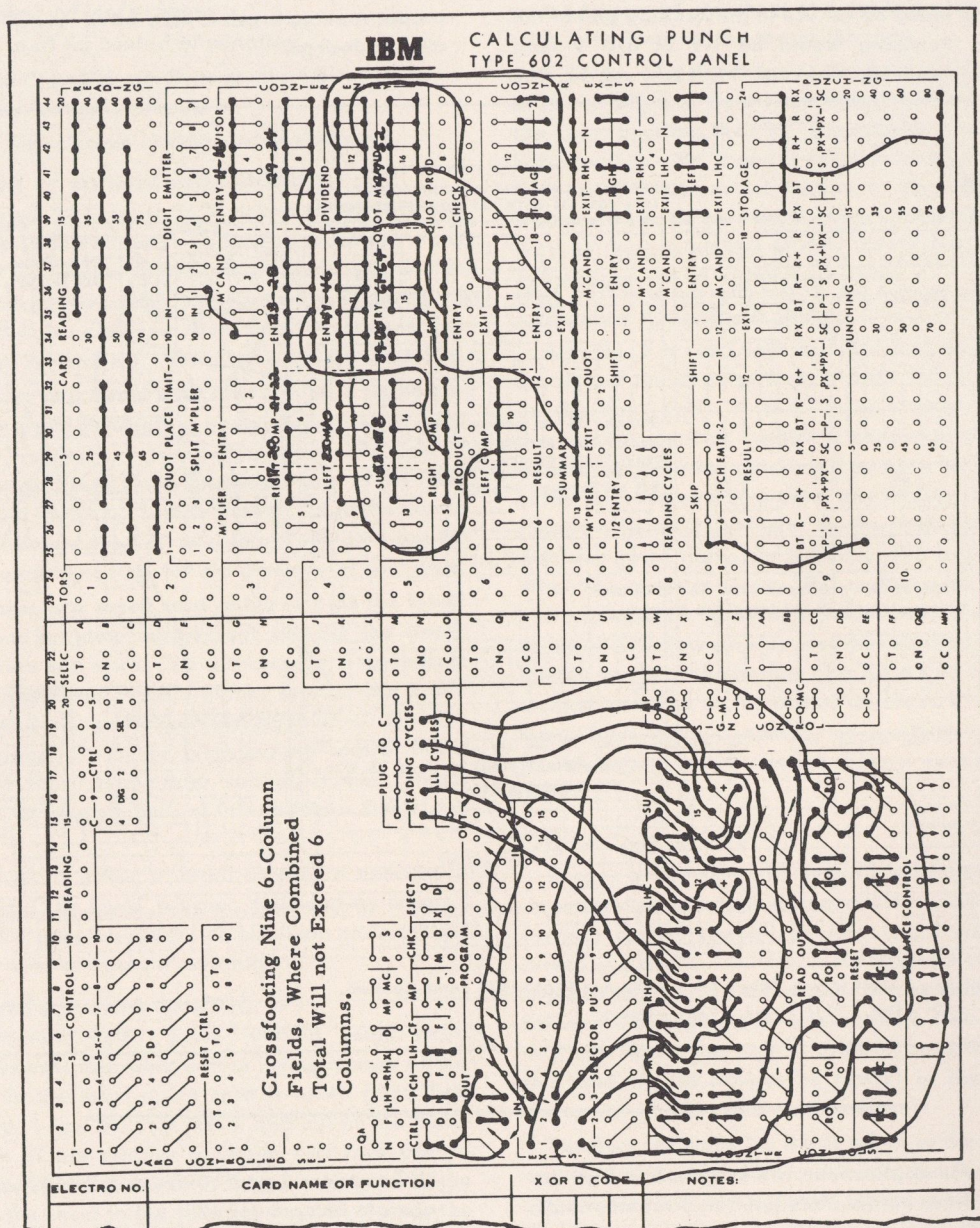
The attached diagram shows wiring necessary to print the months on a report. If Digit Selector 2 is available, it could be used to emit "2"s instead of using Counter 8B as an emitter as shown.

Please note that when the month punching is put into the master cards as a result of matching name cards and sales cards, the proper digit must be emitter-punched, NOT gang-punched. If no digit emitter is available on the reproducing gang-punch, a small deck of emitter

cards can be made up for use in the Reading unit of the reproducer. Punching would be 1-9 in first 9 card columns, 0 in col. 10, 11 in col. 11, 12 in col. 12. The

proper reading brush is then wired to pick up whatever digit is desired.





... about the author:

We are very appreciative of the excellent contribution made by Mr. Richard R. Schmidt, supervisor of the tabulating department at Pierce & Stevens, Inc. Instead of submitting a procedure on one of the punched card applications in his installation, Mr. Schmidt's technical knowledge came to the fore and he submitted several outstanding control panel wiring diagrams. He suggests that it is entirely possible that Pierce & Stevens use the only "right and wrong" Collator checking panel in the industry as it was developed in their office. He has found it relatively simple, extremely useful and a real time-saver.

We are sure that the control panels he developed will do much to stimulate

the thinking on the part of most machine accountants in the furtherance of the interchange of ideas, for which "The Punched Card" was developed.

... about the company:

Pierce & Stevens, Inc., of Buffalo, New York, founded in 1884, is engaged in the manufacture of lacquers and industrial coatings, adhesives, thinners, cleaners and solvent blends. Beyond the daily production of specialized products for commercial and defense needs, P & S technicians have developed many processes and products

which enjoy wide acceptance. Among its better known products is the Hot Spray Lacquer. P & S pioneered this new application of an old principle, resulting in the saving of one full coat, plus added durability of finish. P & S Weatherator is a unique service that duplicates the meteorological changes of nature, thus predetermining durability of finish under extreme heat and cold, humidity and dryness. Developed for bowling alleys was the "Positized" bowling alley finishes. Fabulon is the fabulous floor finish, "twin" of the P & S bowling

alley finish. Another product, Fabuloy, is a superior finish for interior or exterior wood surfaces.

Pierce & Stevens Research Laboratories are constantly testing and analyzing new products preparatory to their introduction to the market. In these laboratories, products are formulated for specialized uses and for specific conditions. The facilities of the laboratories are offered for the solution of specific problems involving products in their field.

THIS IS a method of writing up wiring diagrams for the Model 405 Tabulator which can be used also for Models 402, 403, etc. The diagram shows the requirements of the report and can be used on any model tabulator even though the wiring panels may differ. This method has proven to be a time saver and an aid in training operators as well as an aid to the service men in tracing out circuits. The columns at the top are the same as columns at the top of the actual report. The diagram shows the counters, selectors, type

bars, etc., used in the development of each column of the report. Sepia master copies are made up, showing the basic parts of the machine, the wiring information written in, and as many copies as are required are run on the Ozalid Printmaster machine. Although this is a diagram of a simple machine set-up, the advantages are even greater in the case of a more complicated set-up.

H. O. Howard
General Aniline Works
Rensselaer, New York

SALES PRICE ANALYSIS									
Invoice Number	Branch	Product Code	C O N T R O L	Realized G. D. C. Price cwt SS	Authorized G. A. W. Price cwt SA	Difference cwt - Under Authorization	Sales Pounds SS	Sales Dollars	Column Headings
		Minor Control 26-32 33-35							Zoning Brushes
17-21	24	Minor Control 26-32 33-35		38-43					Upper Alphabetical Type Bars Upper Numeric Type Bars
					2-7	10-15	(Cr. sym. Col. 26) 17-25	(Cr. sym. Col. 38) 28-37	
				27-32	33-40	73-80	13-24	53-64	Counter List
76-80	1	45-51 52-54		66-71	59-64	21-26	37-44	29-35	Adding Brushes
				27-32	33-40	73-80	13-24	53-64	Counters
				+ NoX col. 75 only	(Digits other than 0 Cols. 52, 53, 54 and No X col. 75)	(+X col. 21 & No X col. 75 Digits other than 0 col. 52, 53, 54)	No X col. 75+ X col. 75 -	No X col. 75+ X col. 75 -	+ Or -
							13-24	53-64	Counter Exit
									X) NoX) Selectors C)
							17-25	28-37	Lower Numeric Type Bars
									Lower Alphabetical Type Bars
									Zero Suppressions
									Hammerlock Control

CARD CODES AND X DISTRIBUTION	COUNTER BALANCE	CLASS OF TOTAL
	COLUMN SPLIT	MINOR - 8A - 8B - 8D
	SWITCH CONTROL	INT.
	List Switches - On	MAT.)
	Minor Control - On	) 6A - 6B 6C - 6D
	Major Control - On	FINAL)
	Sheet Length - 14 x 6	
	Skip Restore - On	
		Clear Final Total Before Starting Run

Trucking Company Mechanizes Accounting System

By Jess W. Atwood, Manager,
Machine Accounting Dept.
McLean Trucking Company,
Winston-Salem, North Carolina

THE MCLEAN TRUCKING COMPANY operates more than 1200 tractor-trailers from Boston to Atlanta. The company has thirty-two terminals with an executive office in Winston-Salem, N. C. At the present time there are 1600 people on the payroll.

We needed a method of analyzing our revenue accounting, claims, accidents, payroll, and general ledger items that would eliminate errors or reduce them as much as possible.

In 1947, we installed IBM punched-card methods, and we have been highly pleased with the results obtained and the added applications made possible through their use.

Our machine accounting department is operated by a Manager and twelve operators. We have two accounting machines, two reproducers, one interpreter, one collator, two sorters, three verifiers, and six key punches. We are using approximately 165,000 cards each month.

The most important application of our IBM punched-card method is our revenue accounting. We must analyze and report upon 2500 bills daily. These are typed in our thirty-two Terminals daily.

The bills are grouped together first by terminals. The code clerk receives a copy of each waybill, this copy being known as the "Office Copy". These bills are arranged in proper sequence numerically, and are checked to ascertain that no copies are missing.

The code clerk assigns a code number for each shipper and consignee on each bill directly above their names on the bill. He then designates a number for the commodity writing it in beside the commodity. He also places a code on minimum rate shipments.

Cards are punched and interpreted for each bill. Each punched-card contains origin, destination, billing terminal, bill number, weight, revenue, code, special charges, and commodity code. The cards are verified and corrected on punch machines. The cards are then listed by terminal producing Accounts Receivable Journal, and totals are summary punched. These summary cards are used as balance forward totals each day.

Final summaries at the end of each month are used to make entries to the general ledger. The

use of punched-cards for the A/R Journal or Freight Bill Register has reduced errors to a minimum, and is a very important factor in the time element of preparing reports.

The original revenue cards are then sorted by various codes and re-run on accounting machines to produce the following reports as by-products.

1. Analysis of Outbound Traffic
2. Analysis of Inbound Traffic
3. Analysis of Commodities
4. Analysis of Traffic by Weight Group
5. Abstract of Paid Bills
6. Abstract of Accounts Receivable
7. Abstracts of Aged Accounts Receivable
8. Various Sundry Reports.

For items 5, 6 and 7 above it is necessary to punch a "pull-card" from our paid bills to be collated against the unpaid bills cards. This is a three-part card which requires little punching time.

The mechanization of Paid and Uncollected freight bills has proved very valuable. At the time of conversion from manual to punched-card methods we were five months behind schedule. At the present time we are on an up-to-date basis by using punched-card machine methods.

Objective: Labor Distribution

THIS is a simple application whereby an analysis or study is made of distribution of labor. Cards are pre-punched for the various departments in the organization relating to the type of work being done in these departments. These are sent to the departments daily where they are processed. On these cards are recorded the amount of work, the hours and the cost for each of the jobs involved as completed by the employee.

At the end of the day, all these cards are forwarded from the respective departments to the Tabulating Department where they are computed and checked to determine if the worker is performing according to the specifications called for on the job to be done and to determine his production turnout. This analysis is used on a weekly and monthly basis and is an important factor in considering promotions and wage increases. A further by-product of this analysis is to study the work production methods in the organization to allow for further efficiency.

Electronic Statistical Machine

THE GIGANTIC TASK of evaluating 1950 Census Questionnaires was described recently in "Punch," monthly publication of Philadelphia Chapter, National Tabulating Management Society.

The IBM Electronic Statistical Machine, Type 101, was developed primarily for this operation, to produce systematic random samples and frequencies at an accelerated speed. It combines the functions of sorting, selecting, counting, accumulating, balancing, editing, and printing information at the speed of 450 cards per minute. Although the machine is termed "statistical," many other applications have been adapted for use in various government and commercial installations. A few specific applications are in Sales Analysis, Insurance Statistics, Market Analysis, Payroll and Personnel Status Procedures.

Mr. Newton Rohrman, of S. F. Whitman & Son, Inc., was one of the first Tabulating Supervisors in the Philadelphia area to consider the machine's adaptability to Billing Procedures.

Overload conditions on the Accounting Machines have been experienced by Mr. Rohrman's department during peak seasons. At these periods it is not uncommon to have over a thousand invoices processed daily, averaging 17 items per invoice.

Inventory Control, Territorial Reports, and Accounts Receivable balancing are a direct result of the billing operation, and frequently create backlogs. Mr. Rohrman expects to reduce the accounting machine volume and operating time by the preparation of these reports on the 101.

The Inventory Control Report is prepared at the end of each day's billing, in order for the inventory to be decreased by the number of items shipped. It is also necessary to separate and reclassify the billing cards for replacement in the tub files. Previously two machines were required to perform this job, the sorter and the accounting machine. The combined functions of the 101 permit the separation of header, routing and item cards, the re-classification of the item cards by quantity and item code, the accumulation of total quantities and dollar values for each item, and the printing of the report.

The Accounts Receivable Cards, which are summarized at the time of invoicing, must be balanced against pre-determined totals furnished by the billing department to establish an Accounts Receivable Control on merchandise entries. The cards are also used to accumulate dollar sales by territory for analysis and commission purposes. This process also has been converted to the 101, thereby reducing operating time to half of normal procedure requirements.

Monthly proof of the Accounts Receivable open file, which is primarily a totaling job, is now provided by the 101 machine, in order to take advantage of the increased accumulating and feeding time of 450 cards per minute. Also during this run, unit counts are accumulated to establish a

progressive study of volume activity, i.e., total number of customers represented and the total number of open item cards for each. A unique system has been set up to allow additional amount positions to be accumulated when the normal capacity of counter entry is not sufficient for this job.

Mr. Rohrman has found the machine to be so flexible that he has not as yet realized all of its possibilities and intends to initiate many other applications for its use.



Education

We hope that our efforts will bring about the establishment of the right kind of curriculum for universities, as the result of which, the day may come when a man may call himself a systems and procedures analyst or a method man and will not have to fear the next question, "But what do you do?"—*Frank Hoffman, Standard Oil Co. (N. J.)*

Supervisory Hints

Because of the tremendous developments in machine accounting, there are three things that supervisors should have and endeavor to develop:

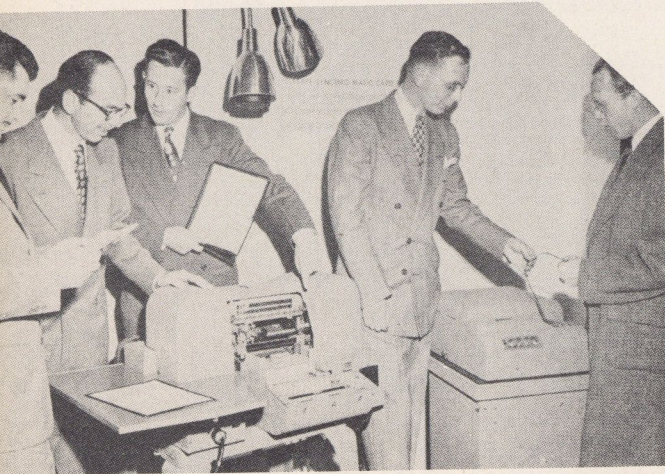
- (a) Technical knowledge.
- (b) Managerial know-how.
- (c) Human relations know-how.

These three factors go hand in hand for a well managed department, enabling the supervisor to keep apace with the technical developments in the tabulating field and yet with the least effort, coordinate his personnel into an efficient and productive group.

As part of the responsibilities of the supervisor, there are many factors with reference to the training of new employees.

"But, Madam . . ."

When tabulating card checks were first introduced, experiences were gained in educating the public in handling the checks carefully, with warnings not to mutilate, spindle or damage the cards in any way. It was during this period, we witnessed an incident that took place in a bank. We were in line behind a lady who presented a tabulating card check to be cashed. The check had been carefully folded—no doubt to better fit into her purse. When the lady handed the check to the teller, we overheard him calling her attention to its folded condition, to which she replied: "I didn't put those holes in there—they were in there when I got the check!"



New Card Punch Operating Unit gives added value to teletype communications. Converter makes possible a creation of punched cards from teletype tape automatically on receipt of message.

THE PAST DECADE has seen a tremendous increase in the use of telegraphic methods for the transfer of reports and tabulated information intra plant and office and between distant points.

Machines and equipment used in the preparation, dispatch and receipt of these data; wire time and facilities required for actual transmission, may be leased or purchased outright.

Now, a Card Punch Operating unit, making possible the automatic creation of punched cards from teletype tape has been developed through the joint efforts of engineers of the Teletype Corporation and of Remington Rand.

Most business men are familiar in some degree with nation wide Teletype facilities. Organizations whose individual components are scattered over a wide area utilize the Teletype for intercommunication. Remington Rand, for example, with its plants and offices located throughout the country, utilizes Teletype as a means of keeping many of its elements in direct communication. Tabulating machines with their speed, accuracy and efficiency are standard equipment in many establishments of any size and scope.

The Card Punch Operating unit is particularly valuable for: sales orders to or from warehousing or distributing points, shipping orders, material and stores requisitions, invoices for spot

stock deliveries, stock buy and sell orders, department store sales tickets, information as to freight car movement, location, etc.

Quite naturally, Remington Rand Punched-Card Accounting equipment lends itself very well to the preparation of accounting records and analyses. Wire transmitted alphabetical and numerical characters are instantly received in the same form as sent. These serve their primary purpose of making data immediately available.

Now equipment is available to reproduce automatically these letters and figures on synchronized mechanical equipment simultaneously on receipt of the transmitted message or dispatched data and adaptable for various record-keeping and report-making operations.

Simple as A B C

The punched-card plan is as simple as A B C — punch, sort and print. It starts with the desired information in a card — sorting the cards into planned sequences — the cards being used to actuate the tabulator which lists or tabulates at the rate of 6,000 lines an hour.

Until the Tape-to-Card Converter synchronized with Remington Rand Automatic Punch was perfected, it was necessary, directly or indirectly, to key punch tabulating cards manually. Now it is possible to wire transmitted media to obtain punched cards automatically.

Some of its widely known features are:

1. Standard typewriter key boards.
2. Simplicity of operation, saving in time.
3. Errors corrected with no wastage of cards, punching accuracy assured.
4. Punch-die principle of instantaneous group perforation.

The Remington Rand Alphabetical and Numerical Punch has always been the fastest and most economical machine producing tabulating

cards manually. In this tape-to-card conversion development, all its exclusive features have been retained. Teletype tape as received contains letters and figures coded in the tape to cause the automatic functioning of all desired operating features of the Punch and of the Teletype equipment.

Now it is possible to type a report, transmit it to one or more distant points, and at the receiving end get page copy and a tape simultaneously.

This tape is read by the Converter unit which translates standard Teletype 5-hole code to Remington Rand tabulating card code, activating the punch and automatically producing punched-cards.

Variety of Operations

Well adapted to a system incorporating the Tape-to-Card Operating unit, are the three units described below. The variety of equipment manufactured by the Teletype Corporation is extensive enough, however, to permit the use of a number of different machines according to the individual installation requirements.

The Teletype Model 19 Set consists of a Sending-Receiving Page Printer together with a Transmitter Distributor. This set combines facilities for:

1. Direct interchange of teletype-written messages.
2. Perforation of tape for subsequent transmissions.
3. Automatic transmissions under control of perforated tape.

With this machine, the operator can transmit a message directly at the time it is being printed; the operator can print a message while at the same time a perforated tape is being prepared for subsequent transmission; the operator can prepare a message only in tape form without printing — this tape to be transmitted at a later time. While performing this latter operation, the machine can also be used simultaneously to receive a message. In fact, at any time the operation of this machine may be interrupted to receive an incoming message.

This Sending-Receiving Page Printer consists of a keyboard similar to that of a typewriter, together with type bars for the printing of the information onto paper in roll or continuous form.

The most economical operation of this page printer is that of typing the report and at the same time automatically perforating the tape. The report would not be transmitted at that time but would be sent later from the tape. By so doing, the operator can take the necessary time to insure accuracy of the report so that the tabulating cards which will be punched from the tape at the receiving end will, in turn, be accurate.

At the receiving end, a Teletype Model 15 Receiving Page Printer can be used to automatic-

ally prepare the reports in printed form. This machine is actuated directly from impulses received over the transmitting lines. It records the reports in identical form to those sent. Of course, such a unit as the Model 19 Set, just described, can also be used at the receiving end.

One of the machines used to prepare tape at the receiving point is the Teletype Model 14, Typing Reperforator. As a message is received this machine perforates the tape and at the same time interprets the message on the tape.

Tape in hand, it is a simple matter now to convert to usable punched cards. Here is where the true value of the Tape-to-Card Converter comes into play.

No manual key punching—no human element of error—steady hour-by-hour production. Into the converter goes the tape — out of the punch come the cards.

*"SYSTEMS
for modern management*

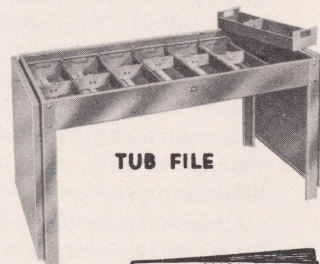
Mr. Stufflebeam is the Vocational Sales Manager, Transportation, Remington Rand, Inc.

TABULATING CARD OFFICE EQUIPMENT

The proper and efficient operation of your punched card installation calls for the comprehensive use of a number of items. MONARCH METAL PRODUCTS, Inc., manufactures a complete line of office equipment — **of all steel construction** — for the filing, moving, sorting and storing of your tabulating cards.



KEY PUNCH DESK FILE



TUB FILE



WRITE US FOR CATALOG

Exclusive representatives in many cities

REG. U. S. PAT. OFF.
724 S. COLUMBUS AVE., MOUNT VERNON, N.Y.

reports. It is also advisable to provide wiring and setup diagrams so that the operator may refer to pictures and illustrations of the function to be performed rather than to have to depend upon words and the correct interpretation of those words.

Manuals of procedure have their greatest value as a training aid when new operators are employed, or when an operator is trained on another job or another machine, or when someone is absent and the work must go on. We have all heard the expression "Verbal orders don't go," well they go all right, but it usually takes a repetition of the verbal order, perhaps 8 or 10 times before it does go. The value of written instructions lies in the fact that they may be read as many times as desired, and do not require repetition by the supervisor. It is the use of charts, exhibits and illustrations, and pictures, which reduces the number of times written information need be read in order to be understood. It was Owen D. Young who said: "It is not the crook in American business that we have to fear the most, it is the honest man who doesn't know what he is doing."

In order that manuals of procedure may serve their purpose to the best advantage, it is necessary to keep them up to date. It is well to have one procedure in the manual titled "The Procedure for Keeping Manual of Procedure Up to Date." This responsibility should be placed in someone's hands or the supervisor himself should assume the responsibility for making changes. Changes *will* be made.

The manual of procedure is a name that is commonly used to clearly specify the work to be done in the department. It contains job specifications.

Step 2—Determine the Regular Work Loads

The development of the manual of procedure and the job specifications is the qualitative determination of the job. The next step is to turn attention to the quantitative aspect of the work to be done. Once regular work has been specified, it is essential to maintain accurate knowledge of the work load. The supervisor should keep records of actual volumes of documents, cards, and reports, and know how these volumes fluctuate. Knowing this, time factors may be applied to operations.

Some supervisors complain that they never know what volumes of work to expect. They say their work loads fluctuate considerably during the month. They further state that it is impossible or difficult to schedule work when such fluctuating volumes are present, and perhaps use this as an excuse for doing no scheduling. If such supervisors would keep a record of the actual volume of cards or source documents which they receive, they would discover in all probability, that during the month, even though the volumes fluctuated, such changes were in

accordance with a particular pattern. There would be certain days during the month when the volume is low, and other days when the volume is quite heavy. In other words, a peak load situation would become apparent.

Peak loads can rarely be eliminated, although frequently they can be reduced by one expedient or another. The important thing is to know when such peak periods exist, and how much of a work load is present at a peak load period. These are the times during the month when scheduling becomes most essential. Knowing the work load and volume, the next step is to convert these volume figures into time factors. The process of making the conversion will depend upon the type of functions involved. For each operation in the procedure, a time factor must be applied. This factor will be the scheduled or standard time applying to the particular operation to be run at a particular time. Clerical functions are the least predictable. They depend so much upon the human variable that they must be at best an estimate. Such time factors are determined by experience with the type of clerical functions involved, or by performing an experiment, or making a test to see how long 100 items could be processed, or to determine how many items per hour may be processed, and from that determine the time or the load of the volume at hand. In many cases, mere estimates are employed in scheduling clerical work loads. For key driven functions, this determination is somewhat more definite and more predictable. Being a more standard type of function, the time for a key driven operation may be determined from production records which have been kept on previous performance of the particular key punch or key verifier operator. This suggests therefore, that the supervisor must continually keep records of *rates* of production of his key punch operators, not only for each individual operator, but establish an average for the section.

In case of the automatic functions, which in most machine rooms are in the majority, time is determined more scientifically from the supervisor's knowledge of machine speed, setup time, and operator handling time. Knowing the volume of cards to be processed and the speed of the machine, the machine time can be calculated very simply by dividing volume by the speed. This determines the number of machine hours required for the operation. This, however, is not the time that will be needed in order to accomplish these particular functions. To this machine time must be added a certain amount of setup time, which is present with all machine operations, and represents the time for removing the cards from the file or the trays, placing them in the machine, setting the machine up, selecting the proper control panel, putting the forms in the machine, adjusting the machine, running a few operation test cards perhaps, and comparing the result against a sample report, and other details which have to be done once for each operation on each machine. The time required

for these details is referred to as the *setup time*. As the work proceeds, there is additional amount of operator activity involved in the handling of the cards, the adjustment of the machine, checking the work being done by the machine, and other details. These functions we might refer to as operator *handling time*. The total time for each operation, therefore, must be the sum of the setup time, the machine time, and the operator handling time. It is evident that if volumes of cards to be processed through a particular machine operation are small—that is, less than about two thousand cards—the setup time becomes a significant factor; in which case, the determination of the operation time is a process of determining machine time and adding it to the setup time. On the other hand, if volume of cards is great (generally over about 2,000 cards), the process is to determine first the machine time from the volume and speed of the machine, and then apply to this an operational efficiency factor or add a certain percentage of the machine time in order to determine the handling time. The reason for a percentage increase is because handling time increases with the volume of the job. To facilitate this calculation on machine time, or the conversion of volume into time, certain charts or tables have been printed and are available to all machine accounting department supervisors from IBM. These charts and tables are designed to tell the supervisor the machine time corresponding to any particular volume of cards being used on any particular machine. Such charts and tables, of course, cannot tell him how much setup time or handling time to apply to the operation. It is for this reason that these factors, being variable, and applicable only to a particular group of operators, machines and job, must be worked out and applied by the supervisor for his particular installation. Such operational efficiency factors are of extreme importance to the supervisor and become an essential determination that he must make in the evaluation process which we will discuss later. It should perhaps be emphasized that operational efficiency is not a measure of the operator alone, instead operational efficiency may be influenced by the type of machine being used, the type and complexity of the job being done on the machine, as well as the experience and skill of the operator employed.

Regardless of how these time factors are determined, it is important that they be recorded, either on a work sheet for machine loads, on the schedules, applied to the flow chart, or applied to the operator job description.

Step 3—Schedule All Jobs and Operations

Scheduling is the process of fitting jobs into a logical time table. It is a budget of time that provides for beginning and completion time of units of work. Before any scheduling can be done within the machine room, it is essential that "Due-In" time of documents be fixed or "Due-Out" time for the final reports be established, as was discussed in connection with the determina-

tion of objectives. Over-all, inter-departmental schedules are essential before these times can be established for the machine room.

The first objective of the machine room supervisor is to determine processing time necessary for the regular jobs. This processing time is merely the difference in time between the start and finish time for particular jobs. If a "Due-In" time has been established, addition of the processing time will determine the "Due-Out" time. On the other hand, if "Due-Out" time has been established, subtracting the processing time will determine the time at which the job must start. In some cases it may be necessary to fit between the 2 limiting "Due-In" and "Due-Out" times, a certain processing time for the job.

In determining the processing time, the supervisor must consider the flow chart which has been developed, the time factors which have been calculated for each operation, the machines required, and the operator capacity. He must decide which operations must overlap in order to reduce the processing time, or at which point several operators or several machines must be used. Supervisors who have had the greatest amount of success in the process of scheduling have employed graphical methods whereby they let time be represented by distance, such as horizontal distance on a work sheet. By plotting on the several lines on this work sheet the different jobs, the start time, processing time and finishing time may be shown, thereby obtaining the time during the week or month of which these various jobs should start and be completed. It is on this chart that he is able to record the decisions he makes in regard to the overlapping of operations, the doubling up of operators and machines, and the relationship of the job being processed to other jobs which will be running at the same time, in order to avoid machine and operator conflict. It is necessary to take into consideration not only the "Due-In" and "Due-Out" time, but also the relative priorities of the job, and its relation to other jobs to be processed at the same time.

In scheduling, it is advantageous to keep the batches of cards as large as possible. It is much better to run a given job through the machine room one a day in one large batch, than to break the work up into ten smaller batches where each batch of cards is only 1/10 of the total volume, and run the job ten times a day. The reason for this is that when jobs are broken down into smaller batches, operational efficiency inevitably decreases. This is because a greater amount of time is spent at each operation in the setup of the machine and the handling of the work, compared to the amount of machine time involved in the particular function. To state it another way, a greater portion of the time is spent in the manual handling of the work compared to the total machine time involved in the operation. On the other hand, when large batch sizes can be maintained, a greater percentage of the total time will be spent in machine running time, and a smaller percentage

of the time spent on setup and handling time. In determining what size batches must be scheduled in a machine room, consideration should be taken of the frequency with which reports are derived, the routing of work through certain clerical and key-driven functions before it arrives at the machine room, tie-in with other clerical functions in other departments before the job is completed, and the amount of overlapping between operations which may take place within the machine room itself. The more overlapping of operations that is present the smaller the batch sizes must be in order that overlapping may take place at all; consequently the lower the operation efficiency will be.

Machine schedules are sometimes employed to great advantage by indicating on a machine schedule chart the jobs to be run on the specific machines. In this case opposite each machine will be indicated the time at which certain jobs are scheduled to take place on that machine unit. A schedule of this type is not as valuable as the procedure schedules discussed previously, because it does not show the "Due-In" and "Due-Out" times on the several jobs. On the other hand it is more valuable from the standpoint of studying machine utilization. For each machine can be seen the utilization to be expected. It is extremely helpful in scheduling additional or unforeseen jobs in the machine room because there is readily apparent on the machine schedule which machines have already been scheduled, and what machine units are available for additional work. Schedules, whether they be plotted by jobs or by machines, should show how jobs, machines and operators are coordinated through times for most efficient operation.

Just as procedure schedules may be developed to show what machines are needed in the processing, and machine schedules to show what jobs need to be run on the several machine units, in the same way personnel schedules could be developed. However, it is common practice in most machine installations to associate operators either with a particular job, or with a particular type machine in which case if a job scheduled is developed and an operator is associated with a particular job, there is no need for a personnel schedule. If a machine schedule is developed, and we operate by associating operators with machines, then the machine schedule will suffice to schedule personnel also. Thus, by associating operators with either job or machine, the scheduling technique is simplified so that we merely have to coordinate jobs and machines. Departments which operate by associating operators with procedures or jobs generally need to employ a much better trained and a more capable operator, because in this case operators need to know not only all of the machine units that are being used in their particular procedures, but also must be well acquainted with the procedures involved, and are frequently given a great deal of the scheduling and control responsibility that would otherwise be assumed by the supervisor. This method of

operating is most generally found in procedures where small card batch sizes are used. These installations where the operator is normally associated with a particular machine or type of machine have operations involving very large batch sizes.

I heard one supervisor say once, "I cannot make schedules, because every time I schedule work something changes. The boss wants a special report, or some operator finds it necessary to re-run a report, or a machine goes out. How can I keep a schedule when these sort of things are happening all the time?"

Such supervisors fail to understand that a schedule is something to be changed. It is a work sheet on which decisions are recorded as they are made, and can represent nothing more than what the supervisor knows about the work that he expects to do as of that moment. For this reason schedules must be kept flexible. When a change becomes necessary, such as a special report, or a re-run, or any other unforeseen happening which makes a change in schedule necessary, then the supervisor has something to refer to in order to see what adjustment needs to be made. He has the facts before him so that an intelligent decision might be made at that time.

Step 4—Keep Adequate Control of Operations

Effective control is a primary concern of any manager. In the IBM department, control must be kept to insure availability and inclusion of all source documents, to prove the accuracy of results obtained, and to insure correct processing of cards throughout the proceedings. Document control should be maintained by keeping a record of documents received and transmitted, so that all documents may be accounted for at all times. Document control methods are most generally understood and accepted by record-keeping people because in manual and key-driven procedures necessity for keeping control over the flow of documents has been commonly accepted. Many devices are in current use, and may be used in the machine accounting department in the control of documents. Document control in the machine room is still important but not as an intensive a job as it is in manual procedures, because in most machine procedures documents are involved only in a few operations involving the conversion to punched holes and verification. Many devices may be used to control this flow of documents through the key punch section. Document registers, receipt of predetermined totals with batch or item counts, and transmittal and route slips, cancellation and time stamps, and production tickets have all been used to good advantage in machine installations.

Accounting control must provide methods of detecting an error if it exists, locating the error, and correcting the error. In punched card procedures accounting controls are built into the procedure. Employed more usually are systems of checks and balances whereby any error, if it ex-

ists, can be readily detected. Its purpose is so that a supervisor may maintain control over the accuracy of the work being done by both machines and operators. In most procedures accounting control requires that registers of all transactions be prepared. These correspond to the journal or day books required in all good accounting procedures. Generally totals are accumulated from registers and posted to control sheets. Periodically trial balances may be run and the totals compared to balances as found on control sheet.

A third type control is process control. This requires proper batching for economical operations, identification of cards in process, and efficient routing from machine to machine. It is here that flow charts and schedules are extremely valuable in maintaining close control over the progress of work in process. The objective of process control is to maintain control over the physical movements of cards and boxes of cards from machine to machine. This control requires uniform identification. All cards and trays of cards moving through the department must be identified in a standard and normal manner. We should not leave it up to the operator to identify boxes of cards their own way. The routing of work through the department may be controlled either by the use of an individual, such as a chief operator, or assistant supervisors who are thoroughly familiar with the procedures involved and can watch personally the progress of the work from machine to machine until the final reports are produced. A more formal method of maintaining control of work requires the use of a job ticket which is a card or a slip of paper which has the name of the job and a listing of every operation necessary for the cards to move to in order to accomplish the particular job. This job ticket moves with the batch of cards from the beginning to the end of the procedure, and serves in many cases as a convenient record on which certain operating data can be recorded.

Effective control can be maintained as work is being done only if good plans have been laid previous to the time of actually doing the work.

Step 5—Collect Operating Data

Any program of effective control and intelligent evaluation requires the possession of facts. Data should be obtained which may be directly utilized in properly evaluating the work of the department. Supervisors must depend upon operators to record certain operational data pertaining to job, operator, machines, volume, and time. This, of course, would show actual facts for each operation. There are many ways of obtaining operating data from the machine room as the work is being completed. Mention has already been made of the job ticket—that is, a form for each job that is processed, and on this job ticket can be recorded the data to indicate the machine that was used, the operator employed, and the time and volume of the job.

The most common operation record has been found to be the machine operation record. In this case a separate card or form is placed on each machine unit, and whenever an operator uses

that machine for a particular purpose he records on this operation record the job involved, the operator who used the machine, and the volume and time of the work. Still another method of getting the same operational data is the use of the very familiar operator's report. In this case each operator—perhaps at the end of the day—will fill out a report which will show the jobs which have been worked on during that day, the machines used, as well as the volume and time pertaining to the various operations. Still a fourth method of obtaining operating data is to employ the unit record for each operation. A separate card may be filled out to show the same operational data as before. It is here that punched cards have been used effectively and a unit record punched for each operation. In this way, various studies may be made by automatically classifying and summarizing time and volume either by jobs or by machines or by operator.

Other factual information of management importance relates to cost, number of hours, maintenance data, overtime and idle time data. To make cost studies, certain basic information must be obtained which shows salaries of operators, machine service charge, cost of supplies, and burden or overhead costs.

Rarely will all of such information pertaining to operations be obtained from a supervisor at a particular time. Any information of a factual nature which is recorded by operators and passed to the supervisor must be information that can be directly used by the supervisor in evaluating his machine accounting department. There is little excuse for continually compiling information about operations week after week and never using it in the study or evaluation of what is going on.

It should perhaps be emphasized in connection with obtaining operating data from operators that an important personnel factor should be considered. If clerks and operators feel, as they record operating data, that they are being checked up on by the supervisor or by anybody else, the program will probably be unsuccessful. The information will probably be wrong or inflated. On the other hand, if the supervisor is careful to explain to all operators concerned that the recording and use of such data is in no way an attempt to check up on individuals, but a medium for the supervisor to understand what is going on, they will be more likely to cooperate with the supervisor in giving him the correct information he desires about operations. Many supervisors have even found it necessary to eliminate on some reports any indication of operators, either by name or by number, because of a failure to properly administer a program of this type. We may well remember the words of Disraeli when he said: "We put too much faith in systems, and look too little to men."

The success of obtaining the correct operational information from operators, as well as any success which the supervisor may have in any of his departmental administration, will depend more on the way he administers his program or system, not so much upon the system itself. As it has been expressed by a popular song, "It's

Not What You Do, It's the Way You Do It." Employees will rarely be concerned about the *system* that is used, but they will surely be critical of the way the system is *administered*.

Step 6—Evaluate and Improve

When operating data and other facts have been collected, classification and summarization of such data makes possible the evaluation process. Evaluation is the critical comparison of classified summaries to determine their proper relationships.

Since the supervisor has the job of coordinating jobs, machines, and personnel, we may expect any evaluation that he may make of his department to be a valuation of the same three factors. For each job that he performs, he can make summaries of volume, time, cost, hours, and overtime. As the time and cost pertaining to each job is summarized, there is then available the necessary figures and facts to bring alongside the reports which grow out of the jobs. Only by adequate comparison of the results with the cost and time of producing these results can a correct evaluation of the job be made.

For each type machine, summaries may likewise be made of the volume, time, cost, number of hours, overtime, idle time, and maintenance time. Such studies contain essentially the same information, but since the information is classified differently (in this case by machine) different aspects of departmental operations may be examined. In machine studies we are usually interested in maintenance cost and time, and utilization of machines. Similar summaries may be made for each operator for personnel studies.

Comparison of such summary data provides indications of weak points in the operations. Comparisons show machine utilization, such as the ratio between the time the machine is actually used, and the time that the machine is available for use on a regular work basis. Operation efficiency may be determined. This is the ratio between the straight machine time as determined by the volume of cards and the actual time to complete the operations on a given machine, or type machine.

Performance may be studied by examining the comparison between the actual results of doing the work whether by job, machine, or by operator, and comparing this actual performance with the schedule or standard time set up for performing the work.

Many other comparisons are possible. The more common evaluations being made are: comparisons of cost per report produced, cost per document processed, or cost per job, and many other relationships.

It is only through such analysis as mentioned above that intelligent decisions can be made for improvement. It is through such studies and comparisons that the supervisor can determine where the greatest room for improvement lies in his department. Out of such evaluations will come certain changes which the supervisor will make in his plans for the next month or the next quar-

ter. The alert supervisor will be interested in evaluating the decisions which he makes from time to time. Such evaluation of the supervisor himself on the job that he is doing is best made by keeping an improvement chart and records. Such improvement charts attempt to show over a longer period of time certain critical measurement of the effectiveness of the department. For instance, it would be desirable to see a long range improvement chart or series of figures, which show the machine utilization over a period of months or years, and how it improves, or operational efficiency from month to month, or performance from month to month. It is only through such comparisons that the supervisor and management can look upon the machine accounting department and say to themselves "This is a good department because they improve month by month." The best standard in the world against which to measure a given department's activity is its own performance during the previous month.

Conclusions

The preceding six steps of good management of the IBM department do not represent a one time job. On the contrary, they are continuous and repetitive. After step six (Evaluation and Improvement) the manager proceeds with steps one and two again. He again reviews his plan so as to incorporate into the routine the changes and improvements which resulted from his evaluations. Thus, in a well managed department there should never come a time when the manager can rest on the system. Requirements, methods and personnel change continually. Adaptation to changing conditions is a continuous problem of management.

None of these six steps can be carried out without good personnel relationship. The manager must be a leader of people, he must practice sound principles of selection, placement, and continual training. He must be able to delegate certain responsibilities to operators, consistent with their training. He appreciates the value of good morale, and maintains high morale by his manner of administration. Personnel supervision is three-quarters of the supervisor's job. Any success which he may have in supervising the department by taking all six steps as discussed previously will be measured directly by the kind of personnel job he does. Success in any program is very much dependent upon the attitude of the personnel involved, both their attitude about their job and their attitude about their supervisor.

In the final analysis the objective of good management of the machine accounting department is three fold.

1. To produce results of greater value to the organization.
2. To do the work as economically as possible.
3. To do both of these with the best possible personnel relationships.

—Insurance Accounting-Statistical Association
Annual Conference Proceedings

227,000 Billings

Continued from page 133

for tax and other purposes, and for producing a variety of statistical information.

All payments which vary in any way from the above standard are handled as "irregulars" This group includes the approximate 2% of remittances which arrive without Premium Notice, or with a mutilated card; those on which the insured has changed the mode of payment; and late payments which may at the option of the Company be accepted for the following month instead.

On all "irregulars," the Billing Cards are pulled manually and individually repunched and corrected as necessary. Checks are then batched and the "regular" procedure followed as outlined. This means that many of the details which used to cause us a lot of handling trouble—and which still are a headache to many insurance companies—are completely cared for in *one* extra handling step within a few hours of receipt.

Summary

Procedures like these may be drastic reversals of "conventional" methods—but we could see no advantage in holding onto traditional procedures when we had enough volume to justify high-speed mechanical techniques. The fast, accurate, end result is all that counts. For example, in many companies when the insured desires to change mode of payment, a letter of inquiry and a form are required, followed by innumerable office entries. At Reserve, this becomes only a normal "irregular" transaction, handled quickly and without fuss.

The Remington Rand tabulating equipment that so efficiently handles our billing, accounting and issuance of receipts, is supplemented by other mechanical equipment for trimming the edges of the Tabulator-produced postcards, stuffing envelopes and imprinting postage indicia—so that we are able to match mailing speed to production speed.

An important footnote to our whole operation is that individual steps are performed on small machines with low rental costs—and additional equipment can be secured for any phase of the work as necessary. At this writing we are utilizing 6 key punches, 8 sorters, 8 collating reproducing punches, 7 posting interpreters and 2 tabulators with one summary punch.

Reproducing Forms

Continued from page 144

Continuous offset paper masters or continuous hectograph master forms, such as Columbia's COLITHO Paper Plates or MARATHON READYMASTERS, are as simple to handle on the tabulator as a one part form. No special attachments or adjustments are required. Corrections, additions or deletions can be made easily in a number of ways. Using an offset or spirit duplicator, you can reproduce few or many copies

that are sharp and clear.

As an example of the value and flexibility of the continuous preprinted form on COLITHO Plates or READYMASTER units, consider a typical tabulator operation, invoicing. From the preprinted invoice form containing the original tabulated information, we now run off necessary copies for bookkeeping, factory, control, inventory and shipping. In addition to these copies, the original master unit can be used for back orders by inserting easy-to-use variable strips.

Sprocket punched stock forms are available in small or large quantities in a variety of sizes. Many businesses, of course, require custom printed forms to fit in with established procedures. Columbia trains its representatives to give complete assistance in the designing of continuous forms for all business applications.

Using continuous forms preprinted on COLITHO Plates or READYMASTER units will result in great savings of money, tabulating time and effort and eliminate major sources of errors.

Work Simplification

Continued from Page 155

sults in enthusiastic cooperation. The more the question is studied, the more apparent is the fact that the individual produces most effectively in terms of quantity, quality and cost when personal satisfaction is derived from the job. Participation provides personal satisfaction when it is "built on understanding."

Understanding and confidence must permeate the organization from top to bottom. When this situation exists, participation in the elimination of waste will be carried on enthusiastically and will provide the opportunity for self-expression, accomplishment and recognition, provide job interest and develop enthusiastic cooperation. The individual, equipped with the technique and tools to eliminate waste and make improvement, has a tremendous satisfaction in initialing changes and developing better methods.

The change in attitude, the effective teamwork resulting from participation, is well expressed as, "The difference between enthusiastic cooperation and dignified acquiescence."

Standards

It is generally acknowledged that all science is based on the ability to measure, yet without standards, the avenue of measurement is closed to you in your endeavor to reduce the waste in your office. . . It has been said that the office is 20 years behind the factory. Could this be true because . . . we have few company standards and no nationally uniform office standards?—Robert E. Shull, Socony-Vacuum Oil Co., Inc.

Placement Procedures

at Michigan State College

By John F. Schlueter, Placement Director,
and
F. B. Martin, Tabulating Director

IN ORDER to centralize the placement function of a large school the size of Michigan State College and still give adequate service to employers, students, and faculty, a different system of record keeping had to be devised.

After considerable experimentation over a period of three years, our manual forms were re-designed as tabulating cards. Since the College already had a centralized tabulating department, the service was readily available.

The College has a centralized registration period at the beginning of each term. All students are requested to report to the College Auditorium to complete the various records necessary for classification. Here they pay fees, are sectioned into courses, receive their activity books, and complete other required information. As all these records are on tabulating cards, it was a very simple matter to coordinate our system with these procedures.

One area of the Auditorium through which all seniors and graduate students must pass is reserved for the Placement Office. At this point, each degree candidate is given a Placement Registration Card (*Exhibit 1*), a packet (*Exhibit 2*) containing two Qualification Record Forms, and three Faculty Rating Forms, all on tabulating cards. The Placement Registration Card is completed by the student and turned in at registration with his class card. All cards are then sent to the Tabulating Department, where they are processed. The cards are gang-punched, and the Placement Registration Card (*Exhibit 3*) then contains the following information in punch form:

1. Name
2. Student Number
3. Sex

4. Curriculum
5. Class
6. Service (Veteran, Non-Veteran)

The cards are then forwarded to the key punch section where they are punched for major field of study and local phone number. Two lists are then provided for the Placement Office.

One list (*Exhibit 4*) is printed in alphabetical order showing name, telephone number, and major field of study. When the Qualification Record Forms and Faculty Rating Forms are returned to the Placement Office, a check is made on this list opposite the individual name. It is then possible for us to quickly determine the status of the individual student's Placement credentials. This is important, in that students may not be interviewed unless their records are completed. Those students whose records are not completed thirty days following registration are contacted and requested to complete their files.

The second list (*Exhibit 5*) is run in alphabetical order by major field of study; and when a request comes in for a special major, individuals in this category can be readily contacted. This is normally done by notifying individual departments, who in turn notify their students. When insufficient notice has been given the Placement Office for interviewing arrangements to be made by normal channels, this list is especially helpful because it also contains the local phone number, and students can be contacted directly.

The packet of cards containing the two record forms and three faculty ratings has been taken by the student for completion. The two Qualification Record Forms (*Exhibit 6*) must be typed by the student and returned to the Placement Office. The three Faculty Rating Forms (*Exhibit 7*) are distributed personally by the student to the three faculty members of his choice. The Qualification Record Form as used by the interviewer along with the student's Profile Card (*Exhibit 8*) has been prepared by the reproducer from the three Faculty Rating Cards. It is then forwarded to the key punch section where name, degree, height, age, weight, date of graduation, and percentage of college expenses earned are added. We automatically prepare three Profile Cards on each student. This is necessary, since the interviewer may retain the individual Profile Card for his record. A master file of Profile Cards is maintained, and whenever additional copies are needed, the master card is forwarded to the Tabulating Department with instructions for the required number of additional cards.

The back of this card also contains the Qualification and Interview Summary Form that the interviewer may use. A place for the student's picture is also provided on the back of the card, and a picture is actually furnished on request.

For the actual interview, the interviewer is furnished with a complete Qualification Record Card and a Profile Card. The Profile Card may be retained for the interviewer's records. In addition, the interviewer receives, as mentioned previously, a special folder (*Exhibit 9*) containing a thorough explanation of the card system and other facts about the Placement Service and Michigan State College.

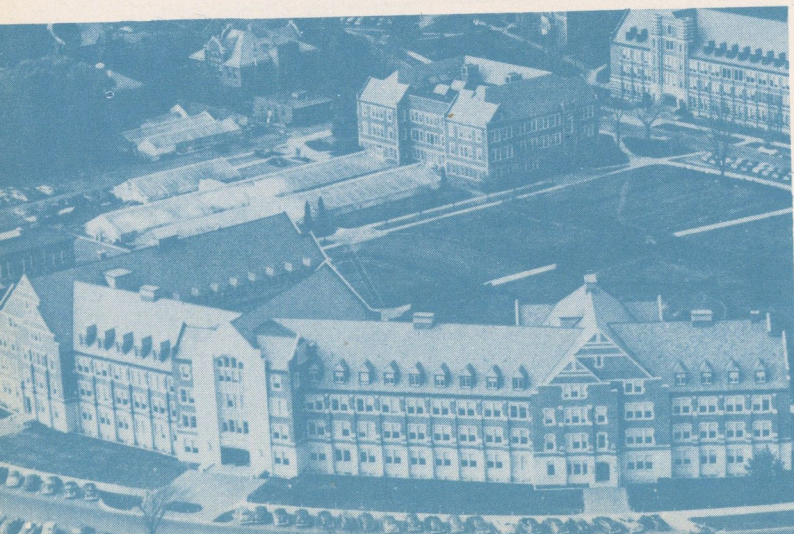


Exhibit 1

STUDENT NUMBER		SEX	CURRICULUM	CLASS	SERV.	SERIAL NO.
HOMETOWN - AT TIME OF FIRST ENROLLMENT		GEOG. CODE	RES.	BIRTH YR.	ADM.	FOLDER NUMBER
M. S. C. PLACEMENT BUREAU REGISTRATION CARD DO NOT WRITE ABOVE HEAVY LINE						
Every graduate student and senior who will terminate his work before next fall term must fill out this PRELIMINARY placement form. FINAL application forms must be picked up at the Placement Bureau IMMEDIATELY AFTER CLASS REGISTRATION. SERVICE BY THE BUREAU WILL NOT BE GIVEN UNTIL FINAL APPLICATION IS COMPLETED.						
STUDENT NUMBER	LAST NAME	FIRST	MIDDLE	LOCAL PHONE NUMBER		
PRESENT LOCAL ADDRESS		CITY	HOME ADDRESS	CITY	PHONE	
YOUR SPECIFIC MAJOR (ME. ENGINEERING, ENGLISH, ECONOMICS, ETC.) HERE						
IF A TEACHER CANDIDATE LIST MINORS HERE 1. 2. 3.						
CHECK TERM YOU WILL GRADUATE BELOW			DEGREE EXPECTED (CIRCLE ONE) BELOW			
FALL	WINTER	SUMMER	YEAR	B. A.	B. M.	M. A.
				B. S.	M. M.	PH. D.
ASTCO 77X55 DO NOT WRITE ON BACK OF THIS CARD - PRINT ALL ITEMS CAREFULLY						

Exhibit 2

TO: _____

DEPT: _____

STUDENTS CO. IN THE INT. RETURN OF THIS CARD

FACULTY RATING 5

SEE BACK OF CARD BEFORE RATING STUDENT

LEADERSHIP WORK FOR FUTURE DEVELOPMENT

NAME: Last First Middle (Please Print)

Student No.: _____

1. Fill out 2. Six 3. With 4. The 5. In 6. F

36921 DOE JOHN CHARLES 82651

805 Orchard St., East Lansing, Mich 8637 Dorchester, Detroit, Mich. WO 8-6721

PERSONAL DATA

Dec. 4, 1917 6'1" 192 Yes B.S., M.A. June 48, June 1939

Yes 2 None B.A. Oberlin June 1939

Industrial Sales

Industrial Management

Personnel Relations

Mid-west

None in United States

except deep South

EDUCATIONAL DATA

M.E.

B.S., M.A. June 48, June 1939

B.A. Oberlin June 1939

WORKING 20 SCHOLARSHIP 20 OTHER G.I. 50

Read, write German; read French

Tau Beta Pi, Dean's List (undergrad.)

Phi Beta Kappa, Beta Gamma Sigma

Exhibit 3

STUDENT NUMBER		SEX	CURRICULUM	CLASS	SERV.	SERIAL NO.
HOMETOWN - AT TIME OF FIRST ENROLLMENT		GEOG. CODE	RES.	BIRTH YR.	ADM.	FOLDER NUMBER
M. S. C. PLACEMENT BUREAU REGISTRATION CARD DO NOT WRITE ABOVE HEAVY LINE						
Every graduate student and senior who will terminate his work before next fall term must fill out this PRELIMINARY placement form. FINAL application forms must be picked up at the Placement Bureau IMMEDIATELY AFTER CLASS REGISTRATION. SERVICE BY THE BUREAU WILL NOT BE GIVEN UNTIL FINAL APPLICATION IS COMPLETED.						
STUDENT NUMBER	LAST NAME	FIRST	MIDDLE	LOCAL PHONE NUMBER		
PRESENT LOCAL ADDRESS		CITY	HOME ADDRESS	CITY	PHONE	
YOUR SPECIFIC MAJOR (ME. ENGINEERING, ENGLISH, ECONOMICS, ETC.) HERE						
IF A TEACHER CANDIDATE LIST MINORS HERE 1. 2. 3.						
CHECK TERM YOU WILL GRADUATE BELOW			DEGREE EXPECTED (CIRCLE ONE) BELOW			
FALL	WINTER	SUMMER	YEAR	B. A.	B. M.	M. A.
				B. S.	M. M.	PH. D.
ASTCO 77X55 DO NOT WRITE ON BACK OF THIS CARD - PRINT ALL ITEMS CAREFULLY						

Alphabetical Code List By Name

LIST No. 1

Exhibit 4

NAME	PHONE #	CODE
ABERCROMBIE JAMES	89951	042
ABRAMOWSKI HARRY J	81553	054
ACTON THOMAS J	86531	039
ADAMO JOSEPH JOHN	81993	054
ADAMS CAROL ELAINE	58403	028
ADAMS JAMES LYNN	83261	083
ADAMS JOHN DAVID	82575	089
ADAMS KENDALL ALFR	2	059
ADAMS MARIAN ELIZ	2	080
ADAMS ONALEE M	83394	050
ADAMS ROBERT GEORG	85005	038
ADLER CLYDE JAMES	2	083
ADOLPH RALPH V		
AGON BARBARA GAYLE		
AHO JOAN ELIZABETH		
AKANS E		

Represents No Phone.

Exhibit 6

MICHIGAN STATE COLLEGE EAST LANSING, MICHIGAN		PLACEMENT BUREAU QUALIFICATION RECORD	
3648 STUDENT NUMBER	Smith LAST NAME	Charles FIRST	John MIDDLE
112 Evergreen E. Lansing, Mich. CITY		1926 Ross Ave. Detroit, Mich. CITY	
86402 LOCAL PHONE NUMBER		RE 63464 PHONE	
PERSONAL DATA		EDUCATIONAL DATA	
2-23-30 DATE OF BIRTH	6' HEIGHT	155 WEIGHT	Yes CITIZEN OF U.S.A.
No MARRIED	None NO DEPENDENTS	None PHYSICAL LIMITATIONS	
LIST IN ORDER OF PREFERENCE YOUR JOB CHOICE:		OTHER DEGREES FROM DATE	
1. Personnel		B.A. June 1952 Econ. M.S.C. DEGREE DATE MAJOR FIELD	
2. Purchasing		PER CENT COLLEGE EXPENSES COVERED BY:	
3. Sales		WORKING 60 SCHOLARSHIP 5 OTHER 35	
FUTURE LOCATION: PREFERENCE Mid-west		FOREIGN LANGUAGES (INDICATE PROFICIENCY): Read, write, speak, Spanish	
RESTRICTION None		SCHOLASTIC HONORS (INCLUDING HONORARY SOCIETIES): Deans List Kappa Kappa Fraternity	
ASTCO 77X29			

Exhibit 8

MICHIGAN STATE COLLEGE EAST LANSING, MICHIGAN		PLACEMENT BUREAU PROFILE CARD																																											
CHARLES J. SMITH NAME OF STUDENT	BA 6 1 175 21 DEGREE HEIGHT WEIGHT AGE	JUNE 52 DATE OF GRADUATION	10 20 70 WORKING SCHOLARSHIP G.I. BILL																																										
COURSE TAKEN:		FACULTY APPRAISAL AND SCHOLARSHIP PROFILE																																											
TO INTERVIEWER: EACH PUNCH IN PROFILE, SCHOLARSHIP THE EXCEPTION, DENOTES RATING GIVEN STUDENT BY A FACULTY MEMBER. THREE RATINGS ARE REQUIRED. HOWEVER, IN SOME CASES LESS THAN THREE PUNCHES WILL APPEAR DUE TO AN INCOMPLETE RATING OR LESS THAN THE THREE REQUIRED RATINGS WERE OBTAINED BY THE STUDENT. UNDER SCHOLARSHIP ONE PUNCH INDICATES THE OFFICIAL GRADE POINT RANGE THIS STUDENT MAINTAINED UP TO THE TIME OF HIS REGISTRATION WITH THE PLACEMENT BUREAU, USUALLY AS A FIRST TERM SENIOR.		<table border="1"> <tr> <td>OUTSTANDING</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>3.00-4.00</td> </tr> <tr> <td>ABOVE AVERAGE</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2.60-2.99</td> </tr> <tr> <td>AVERAGE</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2.40-2.59</td> </tr> <tr> <td>BELOW AVERAGE</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2.00-2.29</td> </tr> <tr> <td>WEAK</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1.00-1.99</td> </tr> <tr> <td>RATING RANGE</td> <td>LEADERSHIP</td> <td>WORK PERFORMANCE</td> <td>CAPACITY FOR FUTURE DEVELOPMENT</td> <td>ALERTNESS</td> <td>JUDGEMENT</td> <td>SCHOLARSHIP (EXACT GRADE POINT RANGE INDICATED)</td> </tr> </table>		OUTSTANDING						3.00-4.00	ABOVE AVERAGE						2.60-2.99	AVERAGE						2.40-2.59	BELOW AVERAGE						2.00-2.29	WEAK						1.00-1.99	RATING RANGE	LEADERSHIP	WORK PERFORMANCE	CAPACITY FOR FUTURE DEVELOPMENT	ALERTNESS	JUDGEMENT	SCHOLARSHIP (EXACT GRADE POINT RANGE INDICATED)
OUTSTANDING						3.00-4.00																																							
ABOVE AVERAGE						2.60-2.99																																							
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BELOW AVERAGE						2.00-2.29																																							
WEAK						1.00-1.99																																							
RATING RANGE	LEADERSHIP	WORK PERFORMANCE	CAPACITY FOR FUTURE DEVELOPMENT	ALERTNESS	JUDGEMENT	SCHOLARSHIP (EXACT GRADE POINT RANGE INDICATED)																																							
		NOTE: THIS CARD MAY BE RETAINED FOR YOUR RECORDS. WE HAVE A SPECIAL CONTAINER FOR YOU TO TAKE THESE CARDS WITH YOU.																																											
THE BACK OF THIS CARD CONTAINS A QUALIFICATION AND INTERVIEW SUMMARY YOU MAY CARE TO USE. ASTCO 77362 Rev. 8-51																																													

Exhibit 10

Code For List Runs

NAME	CODE
ACCOUNTING	29
AGR ECON AND NO MAJOR	1
AGR ENGINEERING AND AGR MECHANICS	10
AGRICULTURAL EXTENSION	2
AGRICULTURAL EDUCATION	19
ANIMAL HUSBANDRY	3
ART AND INDUSTRIAL DESIGN	76
BACTERIOLOGY AND PUBLIC HEALTH	66
BIOLOGICAL SCIENCE	98
BOTANY AND PLANT PATHOLOGY	67
BUSINESS ADMINISTRATION	
CHEMICAL ENGINEERING	
CHEMISTRY	
CHILD DEVELOPMENT	

the Punched Card

Exhibit 5

Alphabetical Code List By Major

LIST No. 2

PAOLETTI ROBERT	85953
RICHARDS MAX EARL	85706
SCIESZKA ALOYSIUS J	46723
WARRICK JOHN EDW	86523
WENDT BARBARA M	83579

FOOD DISTRIBUTION		36
DERBY FRANCIS A	81501	
PERRY CARLYLE M	55852	

SECRETARIAL ADMINISTRATION	
CORNHILL PHYLLIS J	
JOHNSON VIRG	

Exhibit 7

TO Mr. Jones
Economics

I WOULD APPRECIATE YOUR COMPLETION OF THE LOWER PORTION OF THIS CARD FOR MY FILE WITH THE PLACEMENT BUREAU.

STUDENT SIGNATURE Charles J. Smith STUDENT NUMBER 052648

STUDENTS COMPLETE ONLY INFORMATION ABOVE THIS HEAVY LINE
 IN THE INTEREST OF THE CANDIDATE, THE PROMPT RETURN OF THIS CARD TO THIS OFFICE WOULD BE APPRECIATED

M. S. C. PLACEMENT BUREAU

FACULTY RATING SCALE SEE BACK OF CARD BEFORE RATING STUDENT BELOW						ADDITIONAL FACULTY COMMENTS
PLEASE CHECK APPROPRIATE BLOCK	LEADERSHIP	WORK PERFORMANCE	CAPACITY FOR FUTURE DEVELOPMENT	ALERTNESS	JUDGMENT	
OUTSTANDING 5		X		X		GENERAL STATEMENT CONCERNING STUDENT Mr. Smith was an outstanding student in Labor Economics (Econ. 305). He is a sincere, alert young man. In my opinion, the fact that he helped to finance himself through college is further evidence of his character.
ABOVE AVERAGE 4	X		X		X	
AVERAGE 3						
BELOW AVERAGE 2						
WEAK 1						

DATE 9-30-51 SIGNATURE OF FACULTY MEMBER Henry A. Jones DEPT. Econ.

ASTCO 77256 REV. 8-51 DO NOT FOLD OR MUTILATE THIS CARD - PLEASE COMPLETE ALL PORTIONS IN INK OR WITH TYPEWRITER

Exhibit 9

NOTICE TO INTERVIEWERS . . .

To assist you in screening our students as employment prospects, we feel it is desirable to provide you with valuable faculty ratings as well as general information. One of the records you will have available on each student interviewed is the Placement Bureau Profile Card that has been illustrated below. The perforations on these cards refer to information that will aid you in your screening process. Each card may be kept for your own personal records and retained in this folder. The back of this card contains a qualification and interview summary form for you to briefly evaluate each student's qualifications.

a. FACULTY RATINGS:

Three different faculty members have rated this student. In the case of leadership two have rated him above average and one outstanding. Each hole indicates the rating given.

b. SCHOLARSHIP:

This hole contains the grade point range the student has maintained up to the first term of his senior year. In the case of the graduate student, grade point ranges are not punched.

MICHIGAN STATE COLLEGE EAST LANSING, MICHIGAN

PLACEMENT BUREAU PROFILE CARD

CARLSON ROLAND H BS 509 158 20 JUNE 51 90 10

STUDENT DEGREE HEIGHT WEIGHT AGE DATE OF GRADUATION WORKING SCHOLARSHIP G.T. BILL

COURSE TAKEN Civil Engineering

TO INTERVIEWER: EACH PUNCH IN PROFILE DENOTES RATING GIVEN STUDENT BY A FACULTY MEMBER. THREE RATINGS ARE REQUIRED, HOWEVER, IN SOME CASES LESS THAN THREE PUNCHES WILL APPEAR DUE TO AN INCOMPLETE RATING OR LESS THAN THE THREE REQUIRED RATINGS WERE OBTAINED BY THE STUDENT. UNDER SCHOLARSHIP ONE PUNCH INDICATES THE OFFICIAL GRADE POINT RANGE THIS STUDENT MAINTAINED UP TO THE TIME OF HIS REGISTRATION WITH THE PLACEMENT BUREAU, USUALLY AS A FIRST TERM SENIOR.

NOTE: THIS CARD MAY BE RETAINED FOR YOUR RECORDS. WE HAVE A SPECIAL CONTAINER FOR YOU TO TAKE THESE CARDS WITH YOU.

THE BACK OF THIS CARD CONTAINS A QUALIFICATION AND INTERVIEW SUMMARY YOU MAY CARE TO USE. ASTCO 77262 Rev. 10-50

FACULTY APPRAISAL AND SCHOLARSHIP PROFILE						
OUTSTANDING					3.00 - 4.00	
ABOVE AVERAGE					2.60 - 2.99	
AVERAGE					2.30 - 2.59	
BELOW AVERAGE					2.00 - 2.29	
WEAK					1.00 - 1.99	
RATING RANGE	LEADERSHIP	WORK PERFORMANCE	CAPACITY FOR FUTURE DEVELOPMENT	ALERTNESS	JUDGMENT	SCHOLARSHIP (EXACT GRADE POINT RANGE INDICATED)

d. The remaining holes in the card are the source of the printed information on the card such as, name, degree, height, etc.

c. SHADED AREA: This area indicates the average range, not only for faculty ratings, but also for scholarship.

Budget—Payroll— Accounting Operations

By K. R. Iles



THREE YEARS AGO Fansteel Metallurgical Corporation installed a standard cost system, including inventory cost and shop practice standards, in a variable budget program in which practically all accounting was mechanized. In connection with the standards program, the tabulating department has made it possible to issue daily labor variance reports to the production departments in the shop, indicating the variances due to rate and performance based on shop practice standards. Our labor distributions at the present time, reflect inventory cost standard amount versus actual, in addition to the overhead amount, which is a result of the departmental labor factor, multiplied by the inventory cost standard amount.

Budget Reports

The reporting of our departmental budget operations is a very important function throughout our organization in controlling expense. Although this particular application is not new to the accounting field, an urgent factor facing management in considering such application was the importance of time. Events move so swiftly that management must maintain sufficient flexibility in not only being able to abandon an old position, but move on to a new one promptly, and by the same token, the Machine Accounting Department was concerned with the need of flexibility when we entered into the budget set-up in order to advance at any given moment in reflecting any new position that management may direct. Although timing is a very important factor in an application of this kind, accuracy is of utmost importance. Effective reports are the compass of any organization, as they indicate the trend of activities. As the usefulness of reports is dependent upon their accuracy and timeliness, it is essential that the contributing data be correct. All source documents forwarded to our Machine Accounting Department are accompanied by batch control adding machine tapes. Once the pertinent data has been recorded in a punched card, they are immediately reconciled to the batch control tapes and recorded. Without control of this kind, our only purpose would be in reflecting errors of the human element much quicker than they would be detected in any other way. Realizing the foregoing to be true, the elements of timing and accuracy have been coordinated here at Fansteel to bring about the closing of the general accounting books as promptly as possible upon the close of a period.

Other Applications

To give you a general idea of our activities and applications on our IBM equipment, I would

... About the Author:

Since 1942, Kenneth R. Iles has been supervisor of the IBM tabulating and payroll department at Fansteel Metallurgical Corporation, North Chicago, Illinois.

After attending the University of Illinois as a pre Med student for one year, our author changed his educational training program to that of General Accounting, enrolling at Lake College of Commerce, Waukegan, Illinois. To further supplement his education, he completed a four-year course in Industrial Management at Lake Forest College. His educational background in machine accounting includes IBM Administrative Training School at Endicott, New York, and the IBM Advanced Wiring School at Chicago, Illinois.

Mr. Iles has participated in the growth of his installation from 1400 points to its present size of 5000 points. Two and one-half years ago, Fansteel installed a Standard Cost System, including both Inventory Cost and Shop Practice Standards, plus a Variable Budget program in which practically all accounting was mechanized. Under this program, it was necessary for Mr. Iles to work very closely with the Factory and General Accounting Departments, the Budget Department, the Order and Billing Department, and the Sales Department in correlating the many reports and tabulations which were processed on punched card equipment. He initiated a Standard Rate of Production by job in the Key Punch and Verifying Departments, through which it is possible to measure individual employees' production versus standard. Key Punch and Machine Departments are further supported with a complete manual of job instructions and operational flow charts respectively. In addition to this, he also developed daily schedules to set up the flow of source documents from various factory and administrative offices to enable more economic machine operations and scheduling of finished distributions.

... About the Company:

The Fansteel Metallurgical Corporation is one of America's basic industries whose purpose is to serve other industries through the parent company as well as its subsidiaries. The automotive industry uses vast quantities of electrical contacts, carbide and Tantung cutting tools, and resistance welding electrodes and holders.

The electrical generating and manufacturing industries require rectifiers, electrical contacts and resistance welding materials. The metal working industries use carbide and Tantung cutting tools, also resistance welding materials. The chemical industry which includes drugs, petroleum and mining, uses acid-proof tantalum equipment and carbide mining tools. The communications industry including telegraph, telephone, radio and television, uses rectifiers, electrical contacts, capacitors and refractory metals and parts for electronic tubes. Aviation requires electrical contacts, rectifiers, refractory metals, carbide tools and resistance welding materials. The railway equipment industries uses resistance welding electrodes, rectifiers, carbide tools and electrical contacts, and the railroads themselves are large users of rectifiers in their signal and communications systems.

The products made by Fansteel and its subsidiaries may be classified into two general categories: Either they are used as parts or components in the customers' products (electrical contacts, selenium rectifiers, electronic tube parts, for example), or they serve in helping the customer conduct his production operations better, faster, or more economically (carbide tools, tantalum chemical plant equipment, resistance welding electrodes, for example). In either case, the use of a Fansteel product must offer the purchaser improved quality, a saving, an additional profit, or all three.

like to enumerate some of the more important ones very briefly. They are:

- (a) Expense ledger for financial purposes.
- (b) Budget operating reports for budget purposes.
- (c) Factory Direct and Expense labor distributions.
- (d) Year to Date Direct Labor part number analysis in which hours per 1000 is calculated.
- (e) Payrolls computed for gross to net earnings on Factory and Office employees.
- (f) Payroll check writing.
- (g) Payroll Bank reconciliations.
- (h) Accounts Payable distributions.
- (i) Orders received and sales distributions on a current period, or year to date basis for statistical purposes.
- (j) Material distributions emanating from inventory stores requisitions.
- (k) Perpetual controls of inventory stores items by item number reflecting receipts, disbursements, and inventory on hand.
- (l) Purchase variance distribution of inventory stores items in which standard unit price calculation is made and applied to purchase price in the computations.
- (m) Sales commission statements.
- (n) Analysis of net sales by defense agencies or programs set up under NPA.
- (o) Cost of Sales Analysis.

It is obvious from the foregoing paragraph, that we do have and enjoy a good relationship among management and supervisors in other departments and this relationship must be maintained, as this is the basis for all that is accomplished within our department.

Exhibited is a sample key punch procedure form as a material source which is used chiefly by the key punch supervisor in orienting new employees to their position. Also exhibited is a machine operation procedure form and flow chart for our departmental budget operating report. As in the case of the key punch procedures, this, too, is used chiefly by the machine operator until such time that one becomes perfectly familiar with the job. These manuals are prepared for the benefit of the employees and are revised immediately when the occasion demands.

Home Payroll

I thought it may be of interest to exhibit a sample of our departmental budget operating report form. Although this is a composite run for the year, we have and employ the same procedure on a weekly, monthly or quarterly basis. The "Home Payroll" or the upper section of the form, is broken down into work activity for a specific department for any given period, reflecting in addition all hours of work and payroll paid for the various types of work performed. These various subdivisions are determined from the first three digits of any given order number which are issued by management as authorization for work to be performed. The work force is also broken down into two separate and distinct classifications,

namely, "Producers" and "Others." This is determined from the clock number assigned to an employee at the time of hire; there being a series of clock numbers assigned to designate "Producer" or "Other" type of labor. This enables the Tabulating Department to segregate the two different types of labor by the various types of work performed, and sets up a means for management to visualize how effectively the work force is being utilized in the various productive departments throughout the plan.

In addition to this, one may determine the average hourly rate for any given type of work or the average hourly rate within a given department. Although the information contained in this portion of the form is not directly budgeted or measured, it provides a tool to the foreman or department head, for quickly detecting any abnormal relations or any divergences which exist within the department in order that they may be quickly rectified.

Department Charges

The lower portion of the form is "Department Charges." These reflect the expenses being charged to a given department which may flow in from any other department or departments, in addition to any of those charges the foreman of that department may incur within his own department. Said charges are listed in numerical sequence by account number and description and emanate from labor and material sources, labor charges being distinguished by "Producers" and "Others," and material charges as "Material," of which all three categories are crossfooted for "Total."

A feature worth mentioning, I believe, is the sub-totalling of direct labor, local controllable expenses and other expenses. Labor charges emanate from factory, office and administrative payrolls. Material charges emanate from stores requisitions, accounts payable vouchers, expense reports and journal entries. Total budgeted allowance is also indicated opposite those accounts so affected. The essential point here is in providing a means of measuring actual versus standard. Important divergences either way are to be considered danger signals which point to potentially critical situations and require investigation.

The budget application here at Fansteel is of the variable variety rather than the static. Therefore, it is conceivable that budget bases must be built on current events as they take place. The budget section is responsible for supplying budget bases to the Tabulating Department on a weekly basis, which are constructed for the most part, on standard cost direct labor and/or net sales. Standby and variable factors are maintained in our Tabulating Department for the calculation of "Total Budget Allowance" on the right hand side of the form.

I have merely stated in the foregoing paragraphs, some of the principles which we employ here in our Machine Accounting Department in furnishing to management clear, concise and accurate reporting within the very minimum time limits. The methods we employ in arriving at a

conclusion, are based upon good informative key punch and machine operation procedure manuals kept within the confines of the department.

Also exhibited are tabulating cards now in use in our installation for "Accounts Payable" and/or material sources, and summary cards used in conjunction with our variable budget operating application which may be identified by the captions "Home Payroll Recap" and "Expense Distribution." These cards have been designed towards providing (1) a tool for operators and clerks responsible for producing reports, (2) ease in correlating and/or separating of several sources and (3) a strict alignment of punched fields comparable to the alignment of pertinent information contained on the original document.

The applications which these cards serve primarily are noted below:

① Accounts Payable—Material Control

- (a) Accounts payable distributions by account and department charged.
 - (b) Accounts payable distribution by vendor number.
 - (c) Trial balance.
 - (d) Purchase variance distribution on all inventory stores accounts whereby the standard unit price is applied in calculating the standard amount and applying this result to the purchase amount in the computation of a plus or minus variance amount from standard. The variances are all recorded in a clearing account and items purchased in all inventory accounts are entered into perpetual inventory controls at standard.
 - (e) Material distributions for all controlled inventory stores accounts (of which there are seven) emanating from requisitions processed during a given period for the withdrawal of items from inventory stores. These are calculated for standard amount.
 - (f) Journal entry distributions by department and account charged within the subsidiary expense ledger and by account number for those charges being made direct to the general ledger.
 - (g) Salesman's expense distribution emanating from fieldmen's expense reports, by department and account charged.
- (Sources mentioned in the preceding paragraphs Ia, Ie, If and Ig are combined each week, sorted by order number, account charged and department charged, and summarized into an "Expense Distribution" summary card which is to be used in the tabulating of the budget operating report. At the time this is being done, we are producing a preliminary distribution which is audited by the budget department for any inaccuracies of department or account charges. Upon the close of an accounting period, all cards are sorted on the source code punched in column one, which in this instance will result into our having ten distinct sources. These sources are then processed individually for a composite distribution for the period, which in turn will support in full detail, all the charges in the budget operating report for that particular period. Transaction codes (debit/credit) are punched in column 2 of all cards.

② Home Payroll Recap

- (a) Budget operating report, labor only. Home Department work activity only, emanating from factory direct and expense labor and by-weekly office or administrative payrolls.

All labor sources are combined for any given week, and in the instance of expense labor, sorted by order number, account charged, Home Department and department charged and summarized into this particular card with the information indicated thereon. In the case of direct labor, sorts are made on operation number, Home Department and department charged and summarized into this particular card with the information indicated thereon. The breakdown between producers and others is determined from the first digit of the clock number assigned to the employee at time of hire.

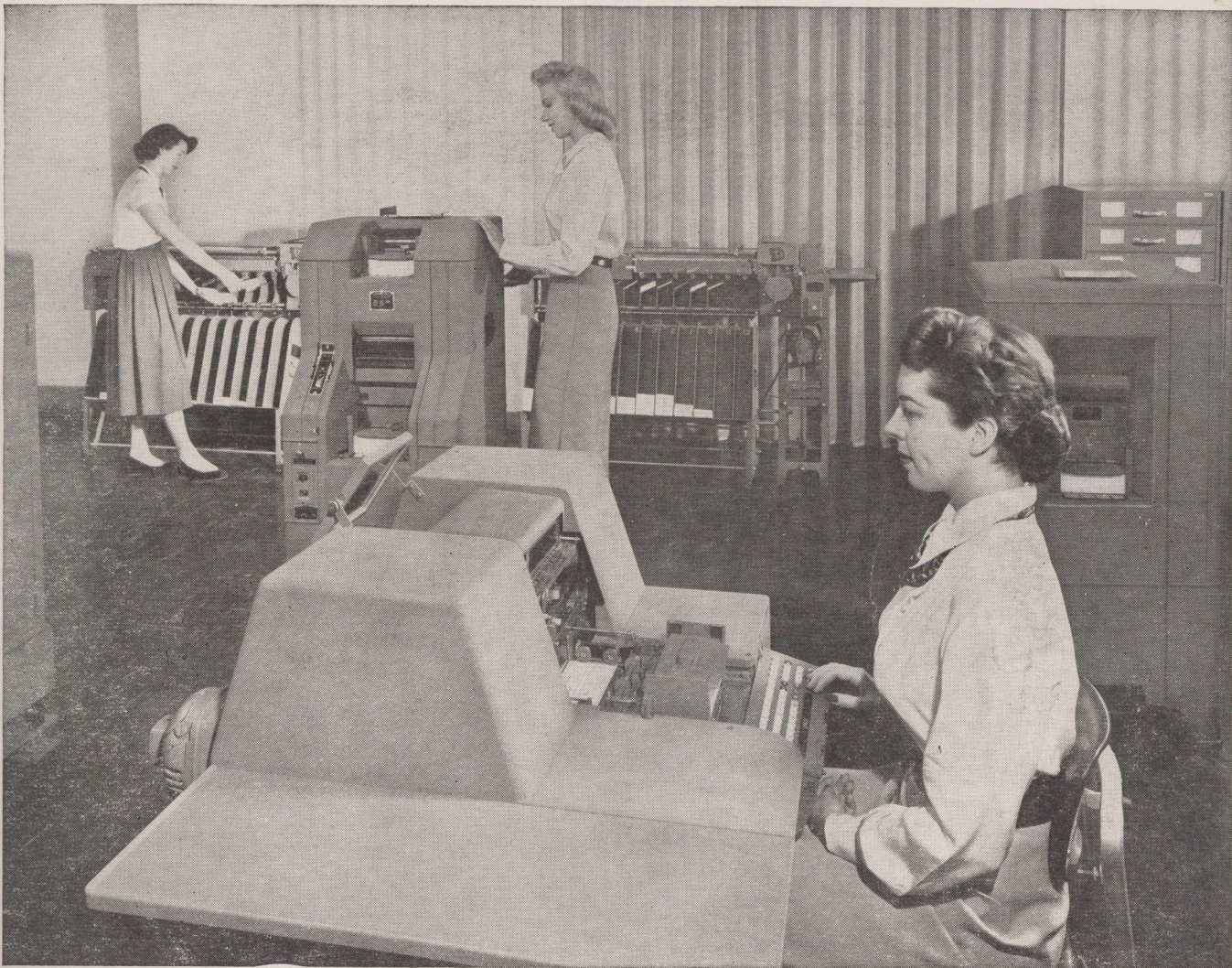
③ Expense Distribution

- (a) Budget operating report—labor source.
- (b) Budget operating report—material source. Summary cards obtained in summarizing all labor sources, or those cards from paragraph 2a, are reproduced into "Expense Distribution" cards. The object here is in providing a means of reflecting expense charges across inter-department lines or that information which is contained in the lower portion of our operating report form. We merely reverse the fields for Home Department and Department Charged (contained in columns one through six) and Tab Code and Account Number (contained in columns eight through thirteen) of the "Home Payroll Recap" card, and reproduce this information into the fields so designated in the "Expense Distribution" card and at the same time, reproduce the "Producers," "Others" and "Total" amounts into their respective fields of the "Expense Distribution" card.

The "Expense Distribution" card is also used at the time we summarize all material sources by department and account charged, whereby department charged, account number, material amount and total amount is punched into their respective fields of this particular card.

To explain our operation thoroughly and our over-all objectives, would require a series of instructional communiques accompanied by actual evidence to have the plan well understood by any parties so interested. However, the information presented herein will serve to illustrate the scope of our tabulating operations.





for greater savings...
 you can **RENT** or **BUY** these machines

Many firms have realized substantial savings by using the amazing speed and accuracy of punched-card accounting machines in getting facts that are timely and complete. Now Remington Rand—and only Remington Rand—offers you even greater savings by giving you your choice of *three* ways to acquire these machines: Outright Purchase, Use-Purchase, or Rental.

Under our unique Use-Purchase plan, for instance, your monthly payments are actually less than the corresponding rental fees — yet you own the machines outright after 100 months!

Punched-card accounting offers you great savings over manual methods. Since Remington Rand offers you three plans for obtaining these savings, it's clear that our representative can be truly impartial in pointing out for your consideration the plan best suited to *your* needs.

Call our local office today for free copies of "Purchase vs. Rental" (TM-739) and "Use-Purchase Plan" (TM-757.1) showing comparative costs. Or, write Management Controls Reference Library, Room 1190, 315 Fourth Avenue, New York 10, N. Y.

Remington Rand
INC.



THIS GIRL HAS 100,000 6 x 4
CARDS UNDER HER FINGERTIPS



SIMPLAFIND—a motorized, automatic card file — uses existing records without recopying or alteration — for tabulating and other standard or special size cards, sheets, address plates, etc.

PUSH BUTTON CONTROL—at a single touch—the cards you want are quickly and automatically positioned before you. They always come via the shortest route—and fast—less than 3 seconds average time. Speed range 100 to 666 selected linear filing inches per second. —Capacity range 300 to 2000 linear filing inches per machine.— Unbelievably compact and speedy.

SO EASY—everything comes to you effortlessly. Removable angle-ended card trays with compressor-followers are only 10" long — light weight — easy to reach — easy to read. Every card is well within comfortable half arm-reach, front to back or left to right.

Simplafind

MOTORIZED

3 - SECOND

CARD FINDING

**NO OTHER
FILE
CAN PROVE
SUCH
CLAIMS**

**ASK FOR PROOF OR SEE A
CONVINCING DEMONSTRATION**

SIMPLA RESEARCH AND MANUFACTURING CO., Inc.
427 Fourth Avenue, Cor. 29th Street, New York 16, N. Y. • LExington 2-9250